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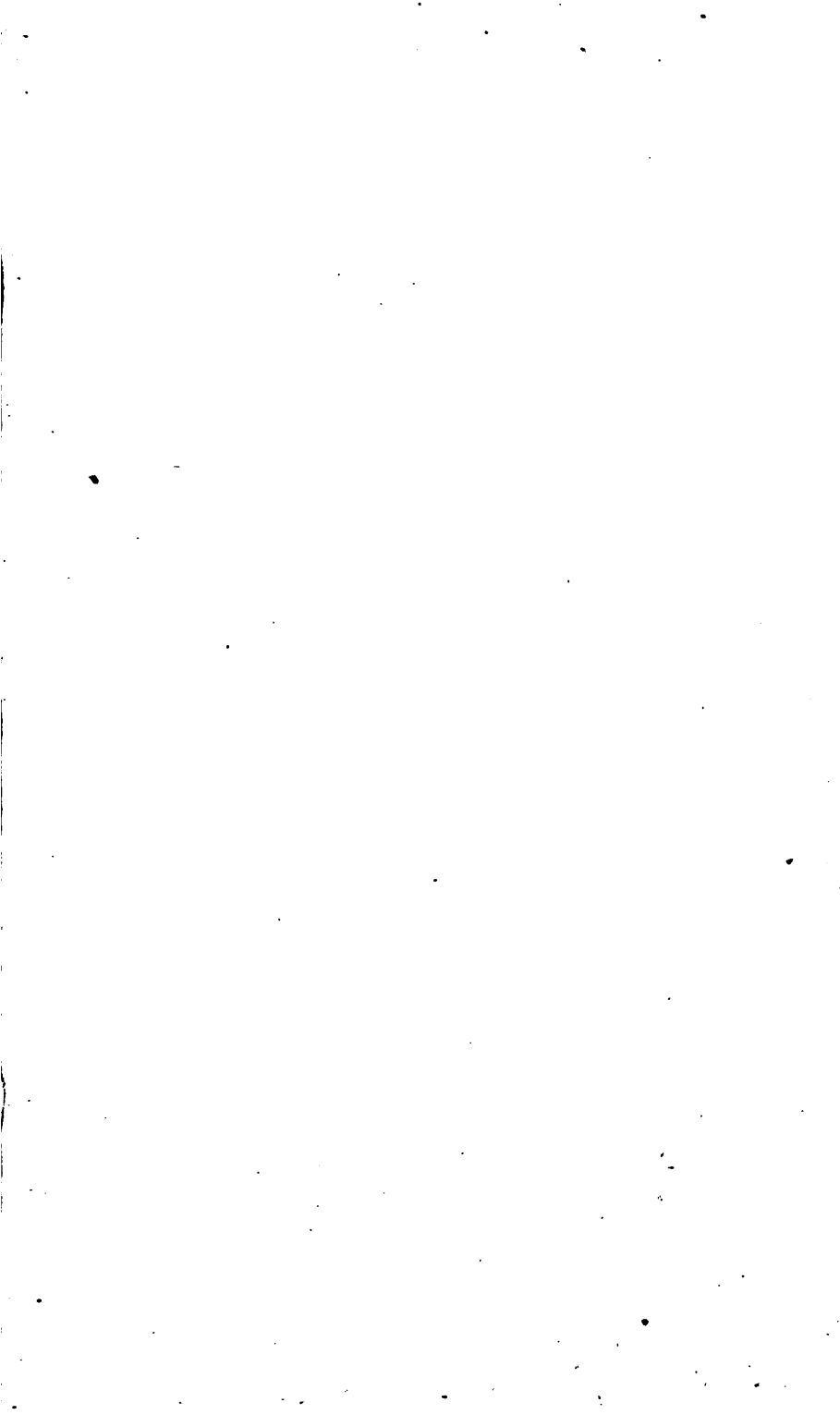
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THE
ARTIST'S ASSISTANT;
OR
SCHOOL OF SCIENCE;
FORMING A
PRACTICAL INTRODUCTION
TO THE
Polite Arts:

IN

Painting, Drawing, Designing, Perspective, Engraving,
Colouring, &c.

WITH AMPLE DIRECTIONS FOR
JAPANNING, ENAMELLING, GILDING, SILVERING,
LACQUERING, &c.

AND A VALUABLE SELECTION OF
MISCELLANEOUS SECRETS.

ILLUSTRATED WITH PLATES.

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Wm. Townsend



P R E F A C E.



ALTHOUGH we consider an apology for the publication of a work of this nature unnecessary; yet custom seems to require a few general observations, as an introductory Preface.

In a country whose prosperity depends upon its commerce, and on the excellency of its manufactures, a production tending to the increase of the former, and the improvement of the latter, cannot be without value or interest. We therefore trust, that few persons who peruse this little Tract, will fail of acquiring some information from it; and that the younger part of our Readers, for whose use it is more particularly calculated, will be induced to purchase, at a small expence, a work from which they may derive more edification, than from any composition of a similar nature.

The distinguished professors of the fine Arts, have been looked upon with veneration by the greatest nations. The names of *Phideas*, *Praxiteles*, *Apelles*, and *Zeuxis*, are joined in history with those of *Pericles* and *Alexander*: what praises have not these latter ages bestowed upon *Michael Angelo*, *Raphael*, *Corregio*, *Titian*, and *Rubens*? and, should all the works of the Founder of the ENGLISH SCHOOL of PAINTING be destroyed, a list of the distinguished characters with whom he lived in habits of the most friendly intercourse, would be sufficient to shew to posterity in what high estimation he was held, both as an artist and a man.

In this country, and during the present reign, we have seen the human mind exerting itself in a remarkable manner in the cultivation of the Arts. Formerly, from the paucity of historical painters, and the great prejudice of the nation in favour of portraits, to the neglect of the nobler branches of the art, it was doubted, by foreigners, whether the genius of the English was at all calculated to shine in the higher walks of Painting. It is now discovered, that PUBLIC PATRONAGE only was wanting; and, to the honour of the Artists of our nation, we now

stand as unrivalled in Historical and Poetical Subjects, as in Portrait. We mention, with respect, the names of *Barry*, *West*, *Fuseli*, *Copley* and *Northcote*, as super-eminent. The Pictures of *Barry*, in the Rooms of the Society for the Encouragement of Arts, &c. being accounted by a distinguished Connoisseur and Historian of the Arts, to be perfect models of Poetic Painting; as the Death of General Wolfe, by *West*, is in the Historic Line.

An equal improvement has been made in the Art of ENGRAVING: It is but a few years since we imported nearly all our prints from France; but, through the superior excellence of the ENGLISH Engravers, we now supply all Europe. Amongst a great number of excellent Artists, we mention the names of *Bartolozzi*, *Woellet*, *Hall*, *Sharp*, *Tomkins* and *Heath*, whose works are too well known to make an enumeration of them necessary.

We have not confined ourselves to the Arts of Painting and Engraving alone: but we have given such instructions as cannot fail to lead the Pupil or Student to a knowledge of DRAWING, of the PRINCIPLES of PERSPECTIVE, the ART of PREPARING

and MIXING of COLOURS, CRAYON, PAINTING, ENAMELLING, JAPANNING, CASTING, BRONZING, GILDING, SILVERING, LACQUERING, STAINING, &c. offering such directions for each as are clear and useful, without being tedious or trifling.

To please the capricious, or to satisfy the fastidious, are things we have not aimed at:—our wish has been to serve the uninformed, and accommodate the inquiring part of mankind with what they may regard as matters of importance. If we have accomplished this, our highest wish is gratified.



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ARTIST'S ASSISTANT.

DRAWING.

THE great advantages derived from a knowledge of the Art of Drawing, are universally known and acknowledged, it being not only useful, but absolutely necessary to those Artists concerned in Designing.

Drawing is the basis of Painting, Sculpture, Architecture, Engraving, Modelling, Chasing, Carving, &c.—It offers so elegant and agreeable an amusement for the leisure hours of the man of business, or the gentleman, that every one who has neglected it has felt and confessed its loss.

To enable those who may not have the assistance of a skilful instructor to become masters of this desirable accomplishment, we shall give plain and concise directions, and point out such a mode of study as we trust will render the task of acquiring it pleasant, and remove many impediments, which, without such assistance, would retard their improvement.

The materials necessary for drawing are—black lead pencils, camel hair pencils; crow quill pens; red, white, and black chalk; crayons and Indian ink.

The black lead pencil should not be held so near the point as the pen in writing; the use of it being for the sketch or first outline of the piece, which should be drawn with freedom, as any erroneous stroke or line may be erased by rubbing the work gently with Indian rubber, or crumb of stale bread.

As the subjects first proposed to the student's attention will be found to influence his future practice more than may be easily imagined, great care should be taken that none but the works of the most eminent masters be put into his hands, lest the ill habits he may acquire by a contrary mode of conduct, should be found difficult to be removed by the strongest exertions of mature judgment. Every figure, nay, every stroke, given him as a pattern, should be excellent in its kind, that he may be early familiarized to beauty, taste, and symmetry. Fortunately for the student, such examples are, at present, by no means difficult to be procured. The works of Bartolozzi afford us the most compleat specimens of correctness of drawing, and elegance of form. After having for a short time accustomed himself to the use of the pencil, he would do well to study, with the most scrupulous attention, the Rudiments of Drawing engraved by that accomplished artist from the designs of Cipriani.

After having prepared himself by acquiring the habit of copying correctly the best prints, he may proceed to study from plaister casts, from which he will derive more real improvement than from copying drawings, since he will, by this method, become acquainted with the principles of the chiaroscuro, or light and shade, by the magic force of which, the paintings of Parrhasius were termed realities; and the fingers of Alexander, (in the character of Jupiter the Thunderer), painted by the famed Apelles, seemed to shoot forward, while the lightning appeared to issue from them.

In the formation of a painter, genius is the first and most indispensable requisite, for the absence of which no human acquirements can compensate. A picture, like a poem, would afford little pleasure, though formed according to the strictest rules of art, and finished with the most indefatigable attention, were genius wanting to compleat the design—a design which may be said to be like the celebrated statue fashioned by Prometheus, lovely, but lifeless, unless genius, like the fire which he is fabled to have stolen from heaven, darts its invigorating ray, and gives a soul to the finished piece.

But though genius be absolutely necessary, since nothing can be done without it, yet it will not alone suffice. Like a rich but uncultivated soil, it will be fruitful only in weeds, were not its exuberances corrected by the rules of art, by reflection, and a strict attention to nature, which is the grand object of a painter's meditation, it ought never to be out of his sight; it is the only source of beauty, since nothing can be pleasing that is not natural.

An intimate knowledge of the beauties of the ancients will be of the greatest advantage; they made nature their peculiar study, and transmitted to us examples in sculpture, which have triumphed equally over the rage of time and Barbarians; examples which have ever been considered as forming a perfect Rule of Beauty.

A close and servile imitation, however, is not what we would wish to recommend; a man may find his account in attending to the manner, and storing up the observations of a well-bred and intelligent acquaintance, without ridiculously affecting his gait, or copying his phraseology.

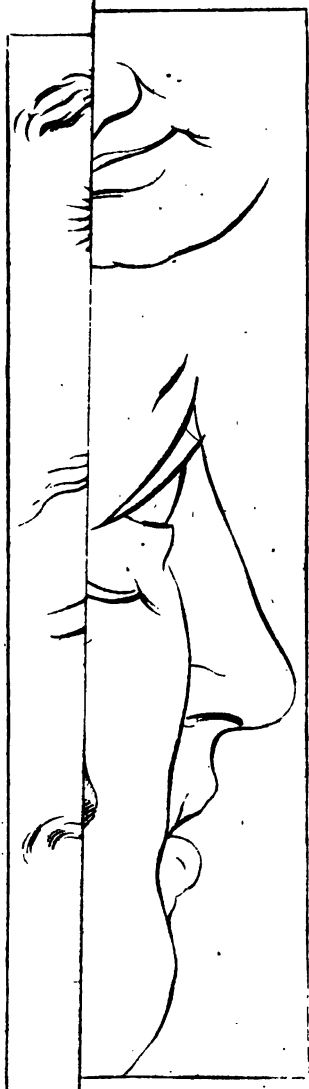
In order to acquire a knowledge of the face, begin with drawing the features separate, placing the copy at such a distance as the eye may measure both it and the drawing without moving the head. Sketch in the first outline very

light; and, in rubbing out, leave faint traces of the first sketch. By proceeding in this manner, without the assistance of rule or compasses, the outline should be brought to the greatest exactness; and in placing the features, a perfect oval should be formed, through which a perpendicular line is drawn in the middle; and across the centre of this, a diameter line from one side of the oval to the other. On these all the features of the face are to be drawn, according to the following rules for drawing a head.

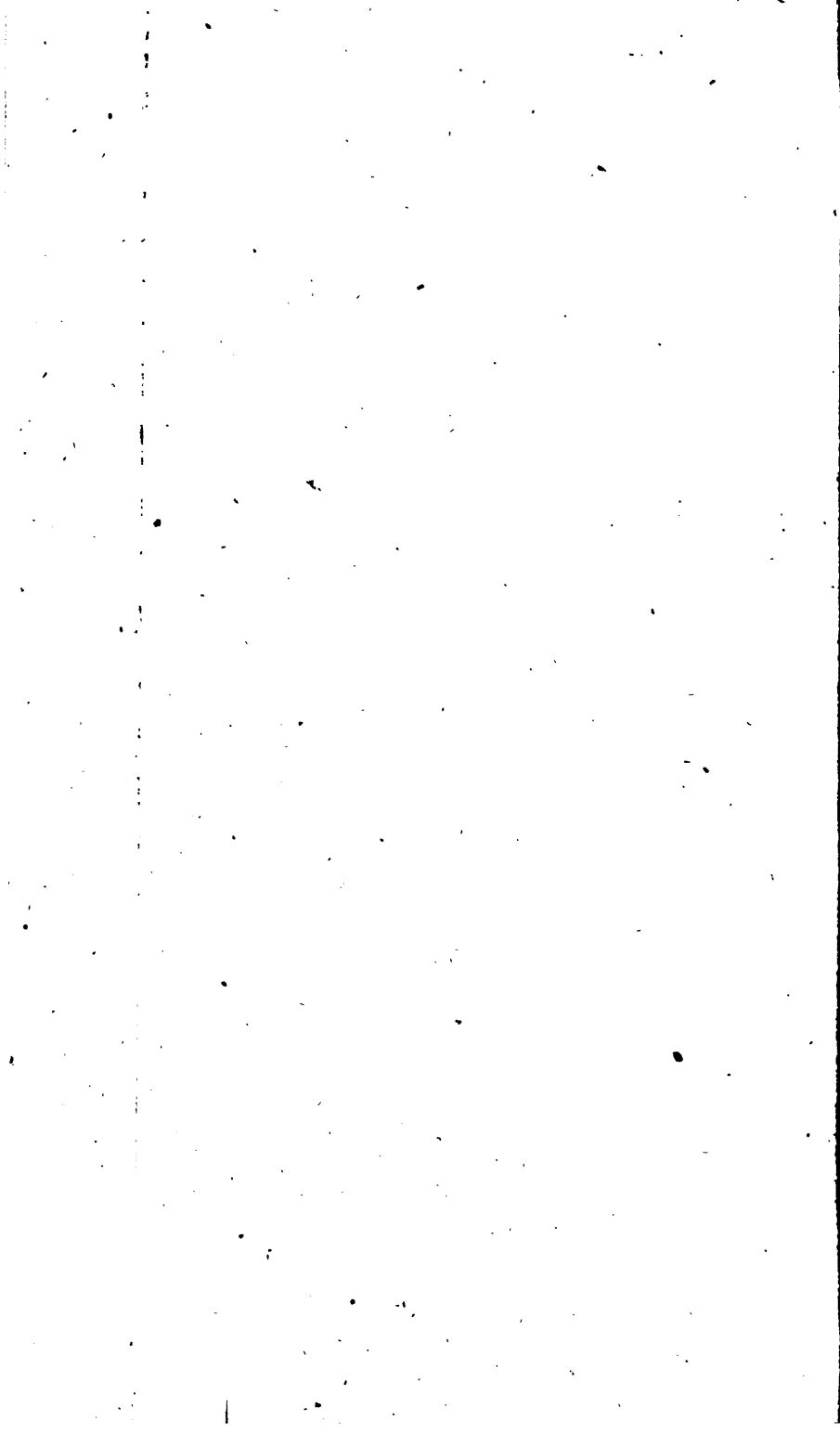
The perpendicular must be divided into four equal parts; one from the crown of the head to the top of the forehead; two from the top of the forehead to the eye-brows; three from the eye-brows to the bottom of the nose; four from thence to the bottom of the chin.

The diameter line divide into five parts; the breadth of the face being supposed the length of five eyes; this is to be understood in a full front face only, and these proportions are rather inconstant in different men, as to length and shape; but in a well proportioned face are nearly right, and should be strictly observed.

When the face turns to either side, then the distances are to be lessened on that side from you, more or less, in proportion to its turning. Most artists begin the drawing with the nose, that being the centre; and then proceed to the other features, observing that the top of the ear is to rise parallel to the eye-brows; the eye to be placed so as to leave exactly the length of one eye betwixt them; the nostrils should not project farther than the corner of the eye; and the middle of the mouth should be on the perpendicular line. In order to understand better the different turnings of the face, it may be very advantageous to procure a piece of wood, made in the shape and size of an egg; draw a line down the middle as before directed; divide this in two equal parts, and draw another across the centre: let



c. l. 12



the features be made as accurate as possible from the foregoing directions. By turning this oval, a great variety of faces will appear, according as it is inclined or turned; but care must be taken to observe in what manner the nose projects beyond the round of the oval. A perfect knowledge of this may enable the student to form an idea of the face better than merely copying prints or pictures without it: but after this acquisition, let the best drawings or pictures be studied that can be procured; previous to which, those passions, in manner of Le Brun, may merit imitation. The positions and actions of the hands are so various, no perfect rule or method can be given for drawing them.

Time and pains should be employed in bestowing care on those members, for it is very necessary not only to avoid all lameness and imperfection, but also to make them appear with life and spirit; the attainment of which must be acquired by application and practice; carefully imitating such postures, both in hands and feet, as can be procured in good prints or drawings. Lines and measures, and such mechanical rules, are not only perplexing, but rejected in the practice of the best masters. The properest method is to lightly sketch the whole shape of the hand or foot with its position or action; and examine carefully that it is correct, rubbing out and altering it till it is so; when the bending of the knuckles, the veins, joints, and tendons, may be drawn with much ease, after the shape and proportion is made perfect in size and attitude.

After a proper study of the legs, arms, hands, feet, &c. and the student has reason to deem himself sufficiently practised in drawing features, the human figure entire should be his next attempt; to measure which, according to Fresnoy, "The Antients have commonly allowed eight heads, though some of them have but seven; but we ordinarily divide the figures into ten faces; that is to

“ say, from the crown of the head to the sole of the foot,
“ in the following manner :

“ From the crown of the head to the forehead is the
“ third part of a face.

“ The face begins at the root of the lowest hairs which
“ are upon the forehead, and ends at the bottom of the chin.

“ The face is divided into three proportional parts :—
“ the first contains the forehead, the second the nose, and
“ the third the mouth and chin.

“ From the chin to the pit, betwixt the collar bones, are
“ two lengths of a nose.

“ From the pit betwixt the collar bones to the bottom of
“ the breast, one face.

“ From the bottom of the breast to the navel, one face.

“ From the navel to the genitors, one face.

“ From the genitors to the upper part of the knees, two
“ faces.

“ The knee contains half a face.

“ From the lower part of the knee to the ankle, two
“ faces.

“ From the ankle to the sole of the foot, half a face.

“ A man, when his arms are stretched out, is, from the
“ longest finger of his right hand to the longest of his
“ left, as broad as he is long.

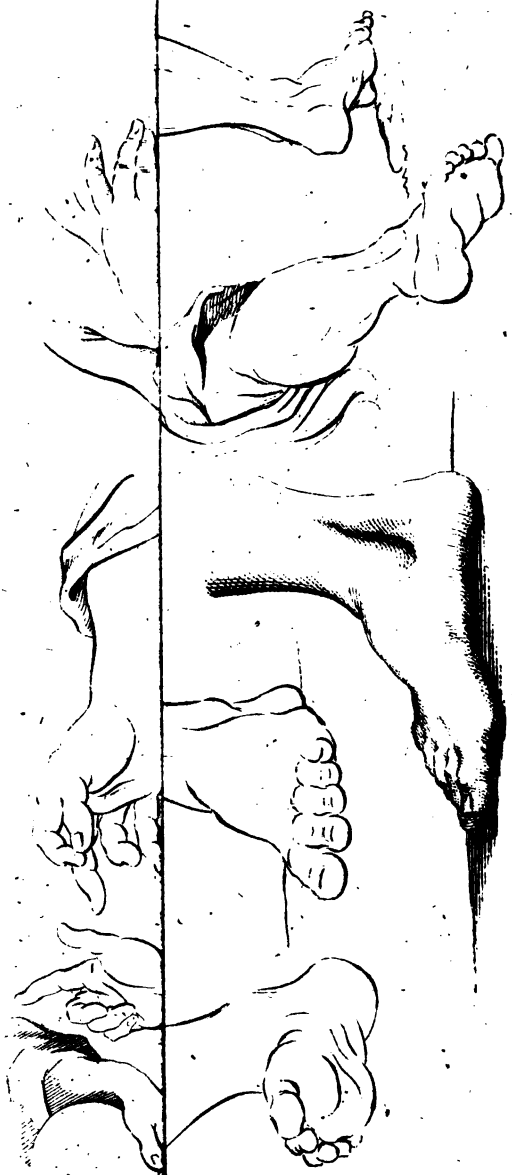
“ From one side of the breast to the other, two faces.

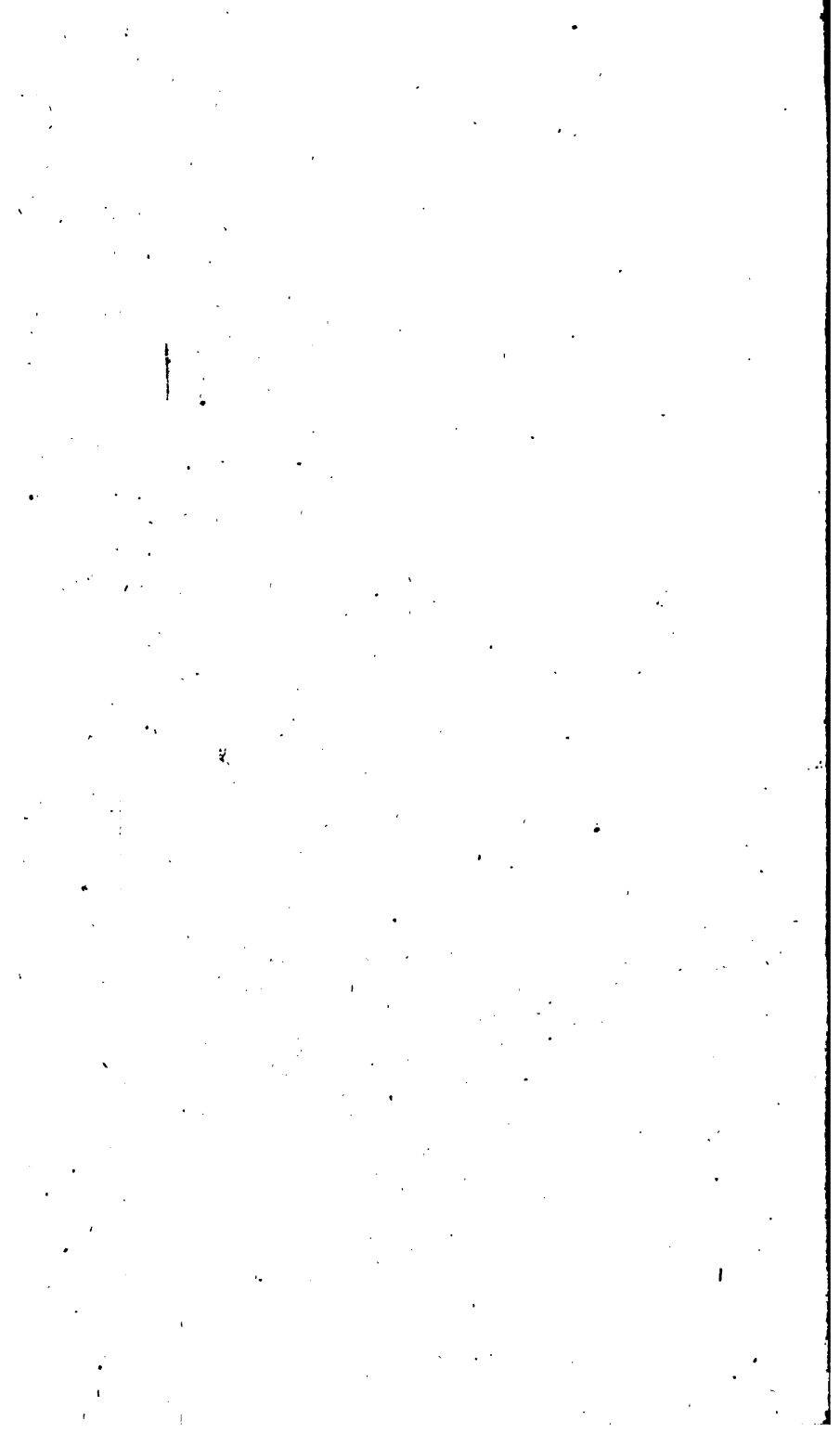
“ The bone of the arm, called humerus, is the length of
“ two faces, from the shoulder to the elbow.

“ From the end of the elbow to the root of the little
“ finger, the bone called cubitus, with part of the hand,
“ contains two faces.

“ From the box of the shoulder blade to the pit betwixt
“ the collar-bones, one face.

“ If you would be satisfied in the measures of breadth,
“ from the extremity of one finger to the other, so that





“ this breadth should be equal to the length of the body,
“ you must observe that the boxes of the elbows with the
“ humerus, and of the humerus with the shoulder-blade,
“ bear the proportion of half a face when the arms are
“ stretched out.

“ The sole of the foot is the sixth part of a figure.

“ The hand is the length of the face.

“ The thumb contains a nose.

“ The inside of the arm, from the place where the
“ muscle disappears, which makes the breast, called the
“ pectoral muscle, to the middle of the arm, four noses.

“ From the middle of the arm to the beginning of the
“ hand, five noses.

“ The longest toe is a nose long.

“ To the utmost parts of the teats and the pit betwixt
“ the collar-bones of a woman, are an equilateral triangle.

“ For the breadth of the limbs no precise measure can be
“ given; because the measures themselves are changeable,
“ according to the quality of the persons, and according to
“ the movement of the muscles.”

In drawing a figure there should be a slight sketch made of the whole, not beginning with the head, and finishing it, then proceeding to the other parts, a method customary to many; in consequence of which the head is often disproportioned, or some part void of drawing. Sketch in the whole outline of the figure lightly, and measure with the eye, or draw the pencil or finger over any way to determine exactness without the rule or compasses. In beginning the sketch the head is the first object, then the shoulders in exact breadth, the trunk of the body next, observing with accuracy the breadth of the waist; next the legs, and lastly, the arms and hands.

The principal difficulty is overcome when a perfect outline is procured; after which the shadows claim the attention of

the student. Every appearance of bodies represented, animate or inanimate, in distance, shape, substance, and distinction, are perfected by this. Let them be first made broad and massy, without attending to the many little distracted parts which fall under a second consideration.

In drawing after a plaster figure the eye will easily discover the general light and shade—the mass of light should be kept broad, and be well attended to, before the smaller parts are divided.

The outline should be exceedingly faint in such parts as receive the light. The rising of a muscle may, by its appearance, prove deceiving, and seem darker than it really is; but by casting the eye to the other darker shadows, a true degree of its tint may be ascertained, and sometimes the light may catch on the projection of a bone near the mass of a shadow, which must be scumbled very tenderly, or it will have a harsh unpleasing effect. This may also be regulated by comparing it with the stronger lights. Observing this rule with care and exactness, is the only true means of preserving the consistency of the whole together.

The instruction given above respecting the mass of light upon the figure, will regulate the student in managing the folds of the drapery, which should never have the light parts cut by dark folds, as the effect of the whole is thereby injured; but this subject will be treated under the article of painting.

Above all, the young student must apply to his task with pleasure, as well as with perseverance; for improvement cannot reasonably be expected, if the mind, (instead of being fired with emulation), gloomily contemplates the employment as a penance; nor must the patient artist be too easily satisfied with his own performance; he must review it and re-touch it, again and again; he must search for its blemishes with the most rigid scrutiny, till, by repeated efforts, he

brings it as near to perfection as possible. In a word, diligence, in the beginning of any study, will render the progress of it easy, and the end delightful.

Of the EXPRESSION *of the* PASSIONS.

THAT language which, above all others, a painter should carefully endeavour to learn, and from nature herself, is the language of the passions. Without it the finest work must appear lifeless and inanimate. It is not enough for a painter to be able to delineate the most exquisite forms, give them the most graceful attitudes, and compose them well together: it is not enough to dress them out with propriety, and in the most beautiful colours. It is not enough, in fine, by the powerful magic of light and shade to make the canvass vanish. No, he must likewise know how to cloath his figures with grief, with joy, with fear, with anger: he must, in some sort, write on their faces, what they think, and what they feel; he must give them life and speech. It is, indeed, in this branch, that painting truly soars, and, in a manner, rises superior to herself; it is in this branch she makes the spectator apprehend much more than what she expresses.

The means employed in imitating her by painting, are the contours or outlines, chiaroscuro and colours; which appear solely calculated to strike the visual faculty. Painting also contrives to represent hard and soft, rough and smooth surfaces, which are objects of touch; and this by means of certain tints, and a certain chiaroscuro which has a different look in marble, in the bark of trees, in downy

and delicate substances. Nay, she contrives to express sound and motion by means of light and shade, and certain particular configurations. In some landscapes of Diderich's, we almost hear the water murmur, and see it tremble along the sides of the river, and of the boats upon it. In the battle of Burgogne, we are really apt to fancy that the trumpet sounds; and we see the horse, who has thrown his rider, scamper along the plain: but what is still more wonderful, painting, in virtue of her various colours, and certain particular gestures, expresses even the sentiments and most hidden affections of the soul, and renders her visible, so as to make the eye not only touch and hear, but even kindle into passion and reason.

Many have written; and, amongst the rest, the famous Lavater, on the various changes, that, according to various passions, happen in the muscles of the face, which is, as it were, the dumb tongue of the soul. They observe, for example, that in fits of anger, the face reddens, the muscles of the lips puff out, the eyes sparkle; and that, on the contrary, in fits of melancholy, the eyes grow motionless and dead, the face pale, and the lips sink in. It is necessary the painter who would be thoroughly acquainted with this principal part of his profession, should study, with care, the learned and ingenious treatise of the Author above mentioned; but, for the young student, the short work of Le Brun,* written for the pupils of the French academy

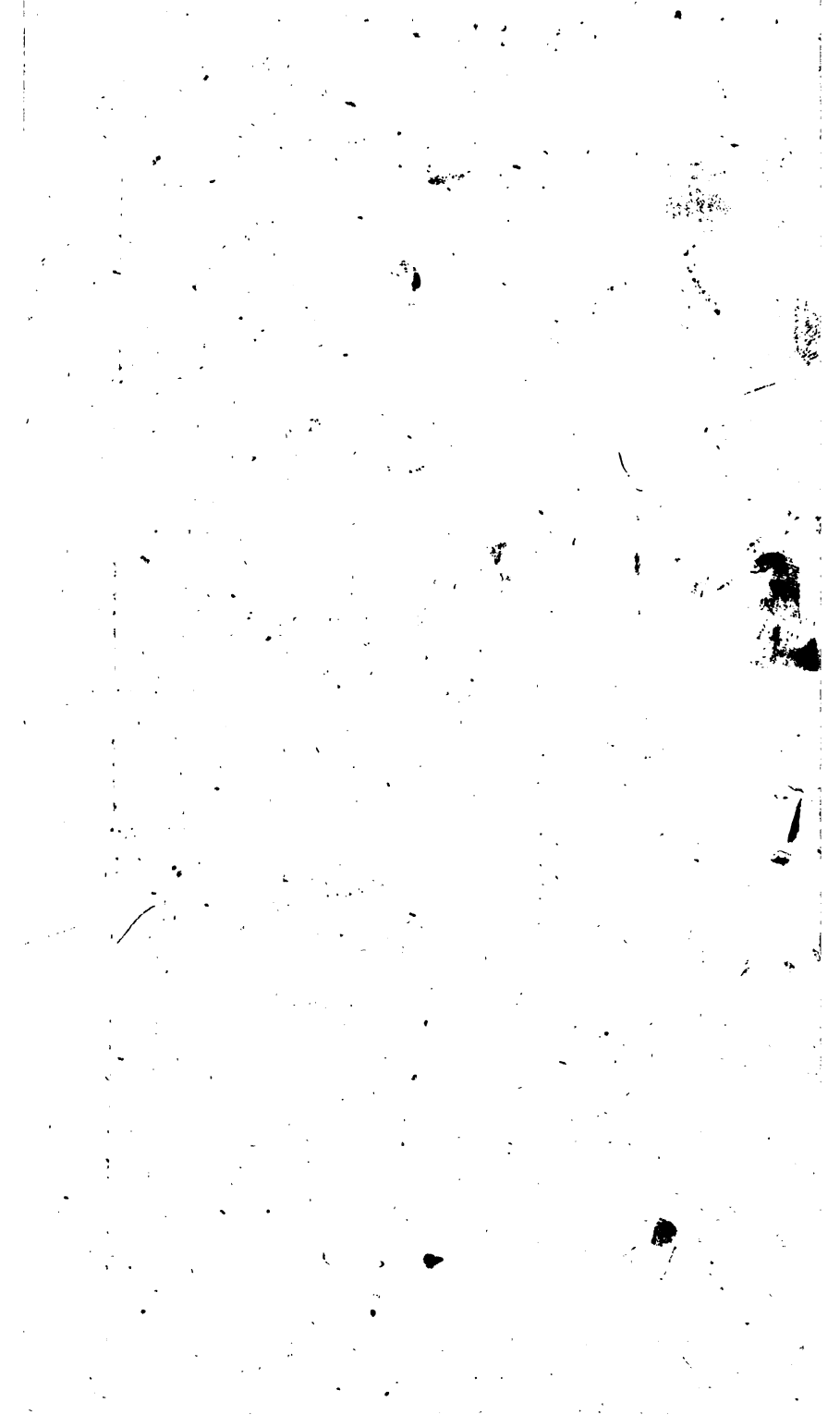
* Charles Le Brun, a celebrated French painter, born at Paris about the year 1618; he was the son of a sculptor of small celebrity. At a very early age he had the good fortune to gain the patronage of the Chancellor Seguier, who, after placing him for some time under the care of Vouet, who at that period was accounted the Raphael of France, sent him to Italy for three years, where he allowed him a large pension.

After his return, having by several considerable works established his reputation, Louis XIV. ennobled him, honoured him with the order of St. Michael, and made him his principal painter. Through the efforts of Le

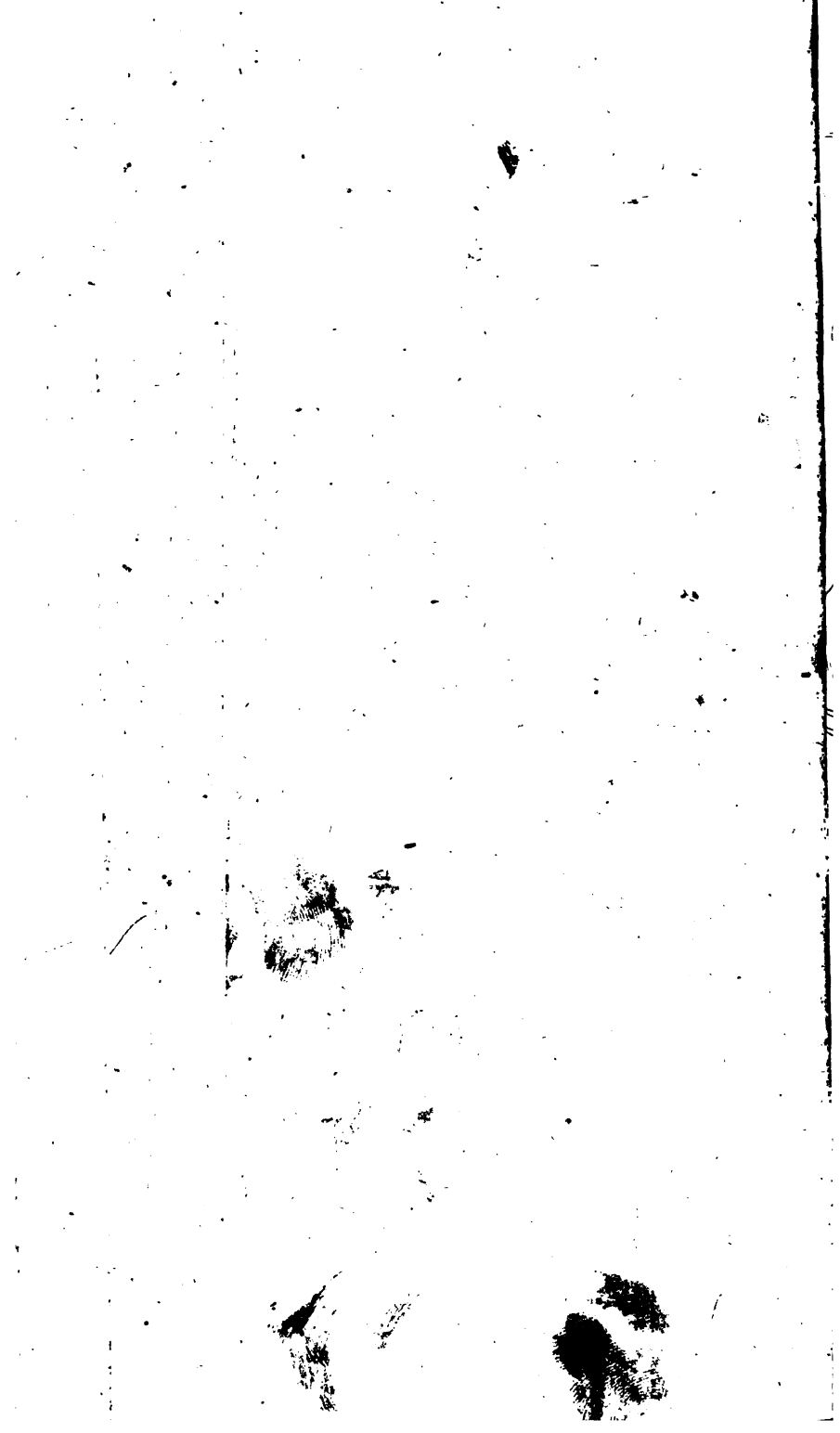
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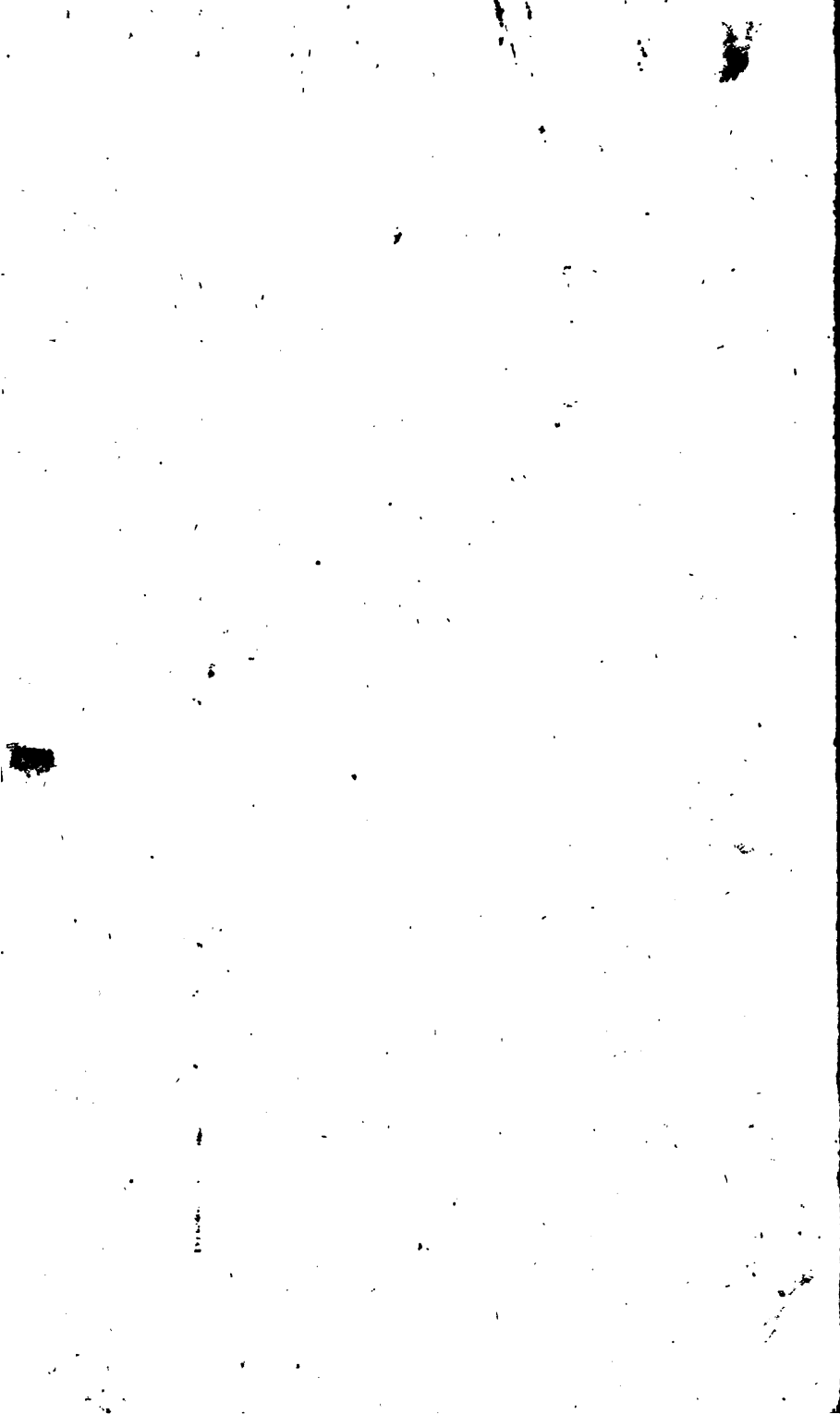






Fear





of painting, will be more intelligible; but it will be of infinitely more service to study them in nature itself, from which they have been borrowed, and which exhibits them in that lively manner which neither tongue nor pen can express.

But, if a painter is to have immediate recourse to nature in any thing, it is particularly in treating those very minute and almost imperceptible differences, by which, however, things very different from each other are often expressed. This is particularly the case with regard to the passions of laughing and crying, as in these, however contrary, the muscles of the face operate nearly in the same manner.*

Brun, the revenues of the academy of painting were enlarged, and the institution placed upon a permanent foundation. He also drew up a project for an academy at Rome, to be founded by the King for the use of the French students who travel there. When the King appointed Le Brun his principal painter he gave him also the direction of the manufacture of the Gobelins, which he attended with such assiduity, that he made the designs for every thing that was done there.

He died in the year 1690.

The most considerable of his works are his pictures, containing the history of Alexander the Great, in the ceiling of the gallery of Versailles, and the great stair-case there.

* As the famous Pietro de Cortona was one day finishing the face of a crying child, in a representation of the Iron age, with which he was adorning the floor, called the Hot Bath, in the royal palace of Pitti, Ferdinand II. who happened to be looking over him for his amusement, could not forbear expressing his approbation, by crying out, Oh, how well that child cries! To whom the able artist said, Has your Majesty a mind to see how easy it is to make children laugh? Behold, I will prove it in an instant; and taking up his pencil, by giving the contour of the mouth a concave turn upwards, instead of the convex downwards, which it before had, and with little or no alteration in any other part of the face, he made the child, who, a little before, seemed ready to burst his heart with crying, appear in equal danger of bursting its sides with immoderate laughter; and then, by restoring the altered features to their former position, he soon set the child a crying again. *Lectures of Philip Baldinucci, in the academy of la Grasca, Illustrated, &c.*

According to Lionardo du Vinci,* the best masters that painters can have recourse to in this branch, are those dumb men who have found out the method of expressing their sentiments by the motion of their hands, eyes, eye-brows, and, in short, every other part of the body. This advice, no doubt, is very good, but then such gestures must be imitated with great sobriety and moderation, lest they should appear too strong and exaggerated, and the piece should shew nothing but pantomimes, when speaking figures alone, are to be exhibited; and so become theatrical and second-hand; or, at least, look like the copy of a theatrical and second-hand nature.

We are told strange things of the antient painters of Greece in regard to expression, especially of Aristides, who, in a picture of his representing a woman wounded to death at a siege, with a child crawling to her breast, makes her appear afraid, lest the child, when she was dead, should, for want of milk, suck her blood. A Medea, murdering her children, by Timomachus, was likewise much praised.

* Lionardo du Vinci had perhaps one of the greatest minds the art of painting ever possessed:—he was a mathematician, an engineer, a poet, and a philosopher. He wrote on his art with the same spirit and talent with which he exercised it.

During his residence at Milan he painted an exquisite picture of the last Supper, for the refectory of the Dominicans. Not being able to find a suitable model, he left the head of Christ unfinished for some time, as was the head of Judas for the same reason, till the prior of the convent, impatient to see the work compleated, pressed him in so troublesome a manner, that he drew the head of the importunate friar, and placed it upon the shoulders of Judas.

He resided the latter part of his life in France, where he ably supported the high reputation he had acquired by his former works. The King, Francis I. visiting him during his last illness, in the year 1520, he rose in his bed to shew his sense of the honour conferred upon him, and his respect for his royal patron; the exertion caused him to faint; and, whilst the King was supporting him in his arms, he expired, in the 75th year of his age.

as the ingenious artist contrived to express, at once, in her countenance, both the fury that hurried her on to the commission of so great a crime, and the tenderness of a mother that seemed to withhold her from it. Rubens attempted to express such a double effect in the face of Mary of Medici, still in pain from her past labour, and, at the same time, full of joy at the birth of a Dauphin. And in the countenance of Sancta Polonia, painted by Tiepolo, for St. Anthony's church at Padua, one may, I think, clearly read a mixture of pain from the wound given her by the executioner, and of pleasure from the prospect of Paradise opened to her by it.

Few, to say the truth, are the examples of strong expression afforded by the Venetian, Flemish, or Lombard schools. Deprived of that great happiness, the happiness of being able to contemplate at leisure the works of the ancients, the purest sources of perfection in point of design, expression and character; and having nothing but nature constantly before their eyes, they made strength of colouring, blooming complexions, and the grand effects of the chiaroscuro their principal study; they aimed more at charming the senses, than at captivating the understanding.

The Venetians; in particular, seem to have placed their whole glory in setting off their pieces with all that rich variety of personages and dress, which their capital is continually receiving by means of its extensive commerce, and which attracts so much the eyes of all those who visit it. I doubt much, if, in all the pictures of Paolo Veronese,*

* Paolo Cagliari Veronese was born at Verona in 1537—he resided chiefly at Venice. He was not famous for composition, nor were his designs correct, but his draperies have a peculiar richness, and are admirable imitations of the different stuffs of which they are composed. He delighted to copy the rich habits of his countrymen, and of the inhabitants of the East,

there is to be found a bold and judicious expression, or one of those attitudes, which, as Petrarch expresses it, speak without words; unless, perhaps, it be that remarkable one in his Marriage-feast at Cana of Galilee. At one end of the table, and directly opposite to the bridegroom, whose eyes are fixed upon her, there appears a woman in red, holding up to him the skirt of her garment, as much as to say, I suppose, that the wine miraculously produced was exactly of the colour with the stuff on her back: and, in fact, it is red wine we see in the cup and pitchers. But all this while the faces and attitudes of most of the company betray not the least sign of wonder at so extraordinary a miracle. They all, in a manner, appear intent upon nothing but eating, drinking, and making merry. Such, in general, is the stile of the Venetian school. The Florentine, over which Michael Angelo* presided, above all things curious of design, was most minutely and scrupulously exact in point of anatomy. On this she set her heart, and took singular pleasure in displaying it. Not only elegance of form, and nobleness of invention, but

which he often introduced into his pictures, sacrificing propriety and truth to brilliancy. He had many faults; but his colouring, and whatever depends on it is so charming, that it makes us forget those qualities in which he failed.

He died of a fever in 1588: his tomb, and statue in brass, are in the church of St. Sebastian.

* Michael Angelo, from his infancy, shewed a strong inclination for painting; and made so rapid a progress in it, that he is said, at the age of 14, to have been able to correct the drawings of his master Dominico Grillandai.

His quickness of eye was wonderful. He used to say, that a sculptor should carry his compass in his eye. "The hands, indeed," said he, "do the work, but the eye judges."

He was extremely disinterested; for his immortal design of St. Peter's church, at Rome, he received only 25 Roman crowns. It was finished in a fortnight.

likewise strength of expression, triumph in the Roman school, nursed, as it were, amongst the works of the Greeks, and in the bosom of a city which had once been the seminary of learning and politeness. Here it was that Domenichino* and Poussin,† both great masters of expression, refined themselves, as appears more particularly by the St. Jerome of the one, and the death of Germanicus, or the Slaughter of the Innocents by the other. Here it was that Raphael‡ arose the sovereign master of them all; One would imagine, that, pictures which are generally considered as the books of the ignorant, and of the ignorant only, he had undertaken to make the instructors even of the learned. One would imagine that he intended, in some measure, to justify Quintilian, who affirms, that painting has more power over us than all the arts of rhetoric. There is not, indeed, a single picture of Raphael's, from the study of which, those who are curious in point of expression, may not reap great benefit, particularly his Martyrdom of St. Felicitas; his Magdalen in the house of the Pharisee; his Transfiguration; his Joseph explaining

* This painter, when young, made but a very slow progress in his profession; he took so much pains, and studied so closely, while in the school of the Carracchis, that his fellow-students called him the Ox, saying, he toiled as if at plow: but Annibal Carracchi, who knew him better, told them, that "This ox, by dint of labour, would make the ground so fruitful, that painting itself would be fed by what it produced;" a prophecy which has been accomplished, since many things may be learned from his works.

† Nicholas Poussin, commonly called the French Raphael, stands at the head of the French school of painters. He studied in Italy, and spent the greatest part of his life there. His pictures possess more grandeur and classic simplicity, than those of any other French painter.

‡ Raphael Sanzio d'Urbino, born on Good Friday, 1483. He is the most celebrated of the modern painters, and the founder of the Roman school. He died on Good-Friday, in the year 1520. A further account of this great man will be given in the article, Painting.

to Pharaoh his dream, a piece so highly rated by Poussin. His School of Athens, in the Vatican, is, to all intents and purposes, a school of expression. Among the many miracles of art with which this piece abounds, I shall single out that of the four boys attending on a Mathematician, who, stooping to the ground, his compasses in his hand, is giving them the demonstration of a theorem. One of the boys, recollected within himself, keeps back, with all the appearance of profound attention to the reasoning of the master; another, by the briskness of his attitude, discovers a greater quickness of apprehension; while the third, who has already seized the conclusion, is endeavouring to explain it to the fourth, who, standing motionless, with open arms, a staring countenance, and an unspeakable air of stupidity in his looks, will never, perhaps, be able to make any thing of the matter. And it is probably, from this very groupe, that Albani,* who studied Raphael so closely, drew the following precept of his: "That it behoves a painter to express more circumstances than one by every attitude; and so to employ his figures, that, by barely seeing what they are actually about, one may be able to guess, both what they have been already doing, and are next going to do." This is a difficult precept; but it is only by a due observance of it, the eye and the mind can be made to hang in suspense on a painted piece of canvas. It is expression, that a painter, ambitious to soar in his profession, must, above all things, labour to perfect himself in. It is the last goal of his art, as Socrates proves to Parrhasius. It is in expression that dumb poetry consists, and what the prince of our poets calls a visible language.

* Albani's success in painting children and handsome females stands unrivalled. He was remarkably placid; and lived to a very great age.

PERSPECTIVE.

PERSPECTIVE is the art of delineating visible objects on a plain surface, such as they appear at a given distance or height, upon a transparent plane, placed perpendicularly to the horizon, between the eye and the object.

There are three sorts of perspective, viz. linear, aerial, and specular perspective.

Linear perspective (to which most properly belongs our definition, and which is a branch of the mathematics), regards the position, magnitude, form, &c. of the several lines or contours of objects, and expresses their diminution.

Aerial perspective (which makes part of the art of painting), regards the colour, lustre, strength, boldness, &c. of distant objects, considered as seen through a column of air, and expresses the diminutions thereof.

Specular perspective represents the objects in conical, spherical, or other mirrors, erect and clear; whereas, on a lawn, and other planes, they appear confused and irregular.

These three sorts of perspective have each its particular doctrine; but before we proceed in the explanation of the doctrine, we must teach our pupils what are planes in perspective; of which there are five sorts, viz. perspective, geometrical, horizontal, vertical, and objective plane.

Perspective plane is a plain pellucid surface, ordinarily perpendicular to the horizon, and placed between the spectator's eye and the object he views; through which the optick rays, emitted from the several points of the objects, are supposed to pass to the eye, and in their passage to leave marks that represent them on the said plane.

A geometrical plane, is a plane parallel to the horizon, whereon the object to be delineated is supposed to be placed: this plane is usually at right angles with the perspective plane.—A horizontal plane is a plane passing through the spectator's eye, parallel to the horizon, cutting the perspective plane, when that is perpendicular to the geometrical one, at right angles.—A vertical plane, is a plane passing through the spectator's eye, perpendicular to the geometrical one; and usually parallel to the perspective plane.—An objective plane, is any plane situate in the horizontal plane, whose representation is required in perspective.

There are likewise several different lines in perspective, viz. terrestrial line, geometrical line, line of the front, vertical line, visual line, line of station, objective line, and line of distance.—Geometrical line, in perspective, is a right line drawn in any manner on the geometrical plane.—A terrestrial line, or fundamental line, is a right line, wherein the geometrical plane, and that of the picture, or draught, intersect one another. Such is the line formed by the intersection of the geometrical plane, and the perspective plane.—A line of the front, is any right line, parallel to the terrestrial line.—A vertical line, is the common section of the vertical, and of the draught.—A visual line, is the line, or ray, imagined to pass from the object to the eye.—An objective line, is any line drawn on the geometrical plane, whose representation is sought for in draughts or pictures.—A line of station, according to some writers, is the common section of the geometrical and vertical planes. Others mean by it the perpendicular height of the eye above the geometrical plane, whose representation is sought for in draughts or pictures.—A line of distance, is a right line drawn from the eye to the principal point: this, as it is perpendicular

to the perpendiculars of the plane, or table, can only be the distance of the eye from the table.—The point of the distance, in perspective, is a point in the horizontal line, at such distance from the principal point, as is that of the eye from the same.

There are other points besides this point of distance in perspective, viz. the point of sight, the third point, the objective point, the accidental point, and the visual point; which term, point, is used for various parts, or places, with regard to the perspective plane.—The point of sight, or of the eye, is a point on the plane, marked out by a right line drawn from the eye, perpendicular to the plane: This is also called the principal point. This point is in the intersection of the horizontal and vertical planes. Some authors call it the principal point; and give the name point of sight, or vision, to the point wherein the eye is actually placed, and where all the rays terminate. The third point, is a point taken at discretion in the line of distance, wherein all the diagonals drawn from the divisions of the geometrical plane, whose representation is required on the perspective plane.—An accidental point, is a point in the horizontal lines, where lines parallel to one another, though not perpendicular to the picture or representation, meet.—A visual point, is a point in the horizontal line, wherein all the ocular rays unite. Thus a person standing in a strait long gallery, and looking forwards, the side, the floor, and ceiling seem to meet, and touch one another in a point, or common centre.

These things being previously considered, we shall next pass to the explanation of the different sorts of perspective.

1. *From a point in a given line A B, to raise a perpendicular.*
See fig. II.

Draw with the ruler the given line A B; then set one foot of your compasses in B, and extending them to rather more than half the length of the line A B, sweep the arch c d; and with the same extent of compasses, set one point in c, and sweep the arch e f; then, without altering the compasses, set one foot in g, and describe the arch h i; next rule through the points c g, to intersect the arch h i in k, and draw the line from k to B, which is the perpendicular required.

2. *Another way.* See fig. III.

From the point A, take the equal distances A B and A C on each side of it, then stretch the compasses to any distance greater than A B or A C, and with one foot of them in B sweep the arch d e; then, with the same extent of compasses, set one point in C, sweep the arch f g; and these two arches will intersect each other in the point h, from which a line drawn to the point A is the perpendicular required.

To draw one line parallel (or equi-distant) to another given line A B. See fig. IV.

Extend your compasses to the distance of the parallel you require; then with one foot in any point of the given line, as in c, describe the arch d e. Again, without altering the compasses, fix one foot in any other point, as in f, and sweep the arch g h; then rule the line I K, touching the outward parts of the two arches, and that will be the parallel to the given line.

4. *To bisect or divide a given line A B, into two equal parts.*

See fig. V.

Take with your compasses any distance greater than half the given line; then with one foot of them in B, sweep the arch c c; and with the same distance, setting one foot in A, sweep the arch d d; and these arches will intersect each other in the points g h; which joined by a perpendicular, will intersect A B in the middle point i.

5. *Upon the end A of a given line, A B, to raise a perpendicular.*

See fig. VI.

Place one foot of the compasses in A, and extend them to any point c without the given line; then set one foot of them in c and turn the circle d e and A, and through d e draw the diameter d c e, meeting the circle in e; join A e, and that right line is the perpendicular required.

6. *To turn the circle through any three given points not in a right line. See fig. VII.*

Fix three points at any distance you think proper, as at A B and C, and join them by the right lines A B and B C; then by fig. V. bisect the line A B with the line d e; which done, bisect the line B C with the line f e; and from the center e, where these lines meet, extend your compasses to A, and describe the circle A B C G.

7. *To draw an oval. See fig. VIII.*

Draw a given line A B, which divide into four equal parts; set one foot of the compasses at C, and from that

center describe a circle *ee*; with the same extent of compasses place one foot in the center *D*, and turn the circle *ff*; then with one foot still in *D*, extend your compasses, and turn the arch *gg*; and with the same extent, placing one foot in *C*, describe the arch *hh*; join the intersections with a perpendicular from *i* to *k*; next, place one foot of the compasses in *i*, sweep the arch *LL*, and without altering them, set one foot in *k*, and describe the arch *MM*.

8. *Another method for an oval. See fig. IX.*

Draw a given line *AD*, and with the compasses extended, placing one foot in *B*, with the other turn the circle *ee*; then, without altering your compasses, on the line *AD* in the supposed point *C* sweep the circle *ff*, and through the points *gg*, where the two circles intersect, draw the perpendicular *hi*; then fix your compasses with one foot in *h*, and extend them so as to describe the arch *kk* to the lower extremities of the circles; then, with the same extent, with one foot in *i*, sweep the arch *ll*, to join the upper extremities.

By these examples it will appear, that an oval of any form or size may be constructed at pleasure, only taking care always to fix the compasses equi-distant from the given line *AD* in the perpendicular *hi*.

PRACTICAL EXAMPLES IN PERSPECTIVE.

1. *To draw a square pavement in perspective. See fig. X. and XI.*

Suppose your piece of pavement to consist of sixty-four pieces of marble, each a foot square. Your first business is to draw an ichnographical plan or ground plot of it, which

is thus performed. Having made an exact square of the size you intend your plan, divide the base and horizon into eight equal parts, and from every division in the base to its opposite point in the horizon, rule perpendicular lines; then divide the sides into the same number, ruling parallel lines across from point to point; so will your pavement be divided into sixty-four square feet; because the eight feet in length, multiplied by the same in breadth, give the number of square feet, or pieces of marble contained in the whole: then rule diagonals from corner to corner; and thus will your ground plot appear as in fig. X.

Now, to lay this in perspective, draw another square to your intended size, and divide the base line *AB* into eight equal parts, as before; then fix your point of sight *C* in the middle of the horizon *DE*, and from the same point rule lines to every division in the base *AB*; after which, rule diagonal lines from *D* to *B*, and from *E* to *A*, answerable to those in the ground plot, and your square will be reduced to the triangle *ABC*; then from the point *F*, where the diagonal *DB* intersects the line *AC*, to the opposite intersection *G*, where the diagonal *EA* crosses the line *CB*, rule a parallel line, which is the abridgment of the square.

Then through the points where the diagonals cross the rest of the lines, which go from the base to the point of sight, rule parallel lines, and your square pavement will be laid in perspective, as in fig. XI.

2. *To find the height and proportion of any objects, as they appear above the horizon, on a supposed plane. See fig. XII.*

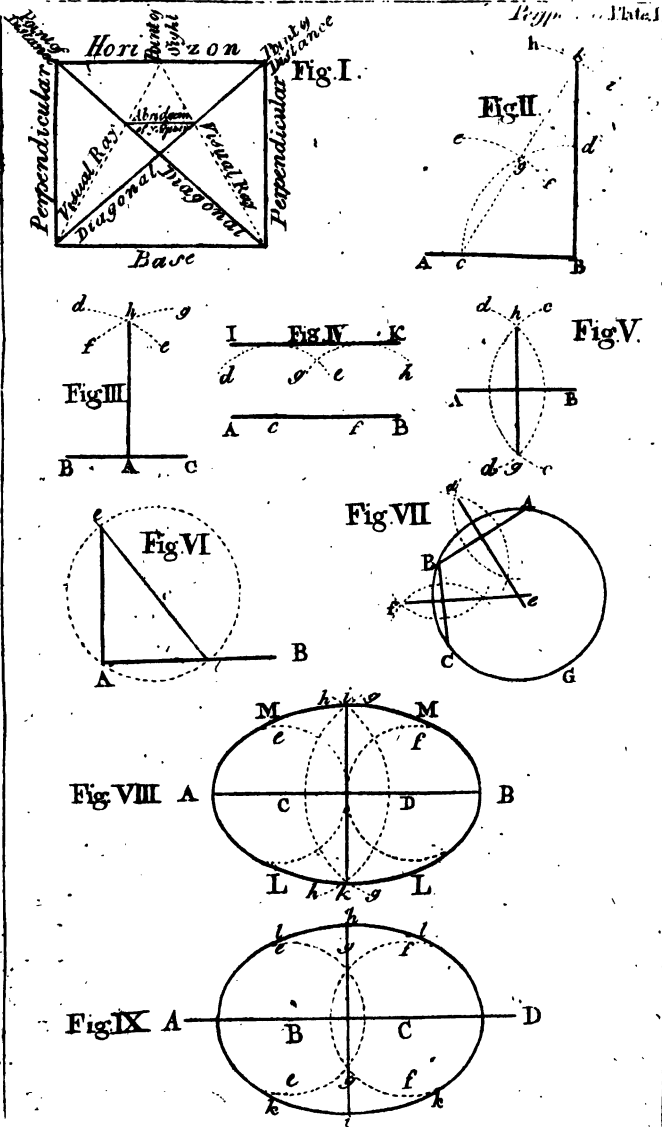
First, rule your horizontal line *NO*, and fix your point of sight, as at *M*; then mark the place of your nearest pillar, by making a dot for the base or bottom, as at *A*;

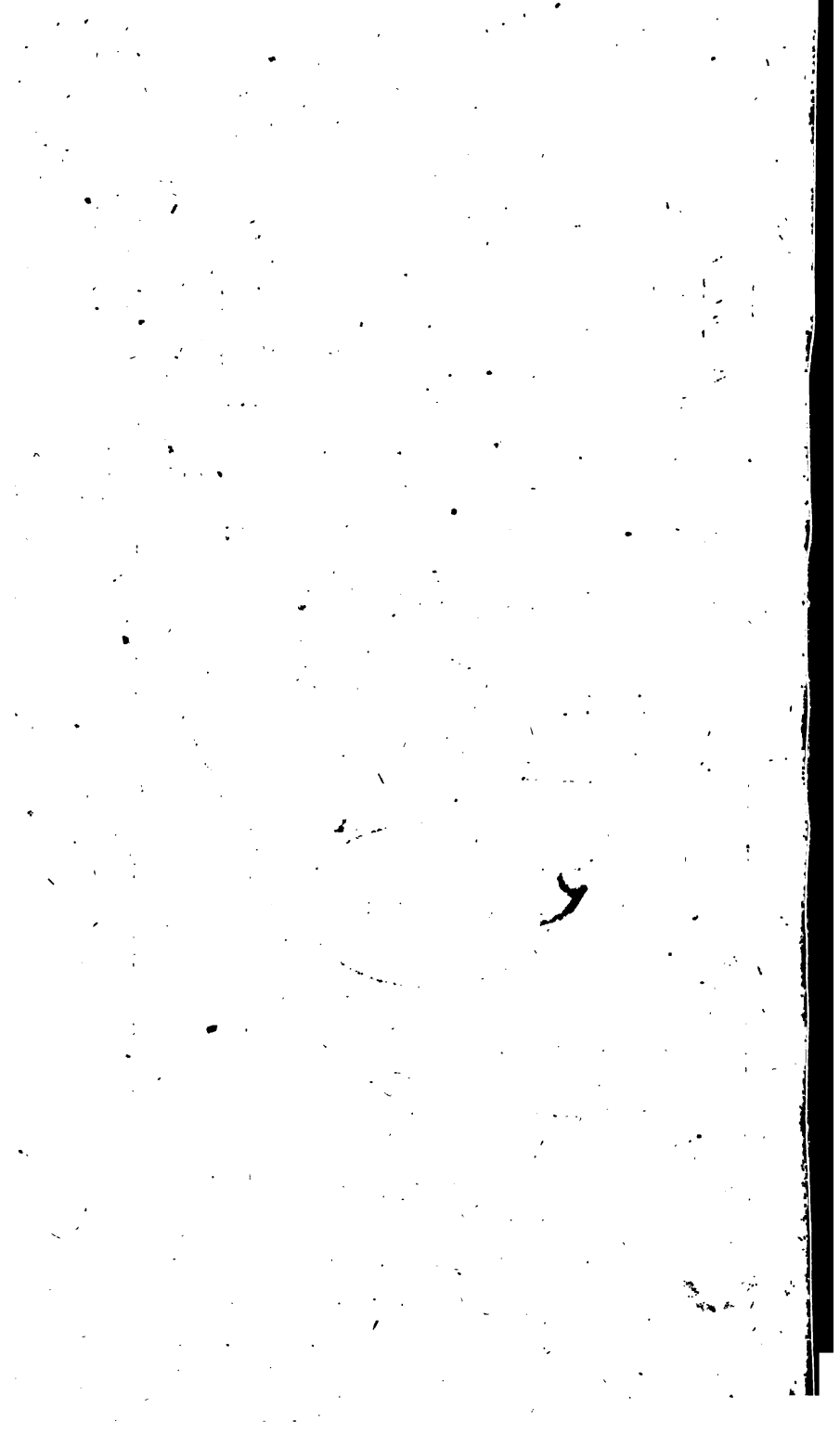
and another for the summit or top, as at B: rule a line from A to the point of sight M, and another from B to M, and these two lines will give the height of any number of pillars. As for example; suppose you would have a pillar at C, fix your dot for the base, and rule from thence a parallel line to meet the diagonal A M at D; then rule the perpendicular D E to the diagonal B M; which perpendicular is the height of your figure required at C. Or, if you would place pillars at F and I, observe the same method, ruling the parallels F G and I K, and the perpendiculars G H and K L will give their heights at the distances required.

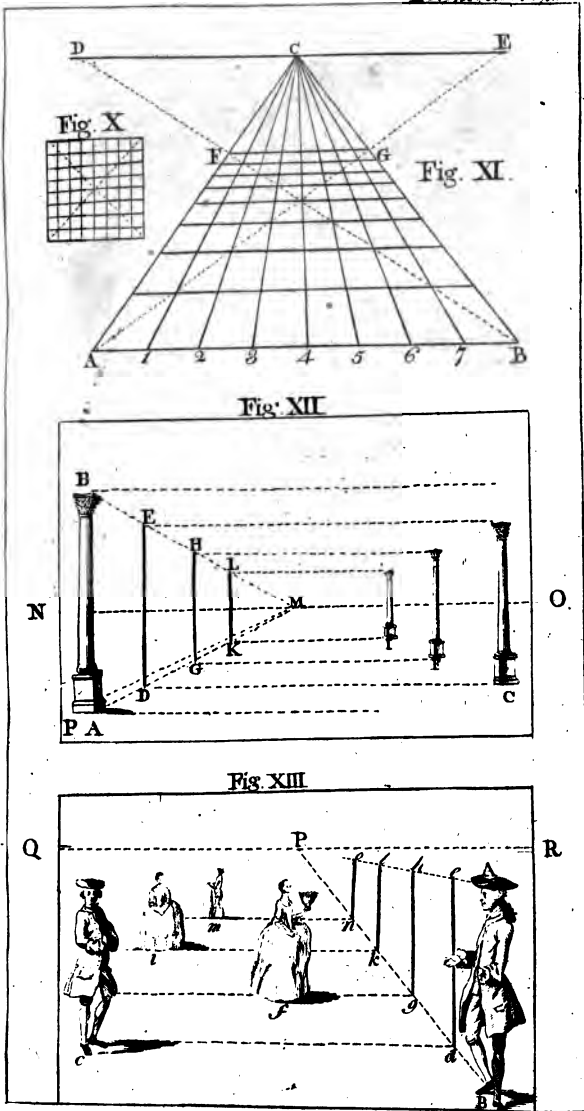
To find the diameter or thickness of pillars at any particular distances, you are also to be guided by that nearest the base. For instance; suppose your nearest pillar A B to be ten feet high and one foot in diameter: divide it from top to bottom into ten equal parts, and set off one of them upon the base of the pillar; then rule a line from the point of sight M to the diameter P, and you will have the thickness of all your pillars on their respective parallels or bases.

3. *The same rule exemplified in objects below the horizon. See fig. XIII.*

If you would know the heights of a number of figures below the horizon, rule your horizontal line Q R, and fix your point of sight, as at P; then place your nearest figure, or mark the dots for the head and feet, by the points A and B, which answers the same purpose; and rule from these dots to the point of sight the lines A P and B P; and if you would find the height of a figure to be drawn at c, rule from thence the parallel c d to the diagonal B P, and the perpendicular d e will give the height required. The







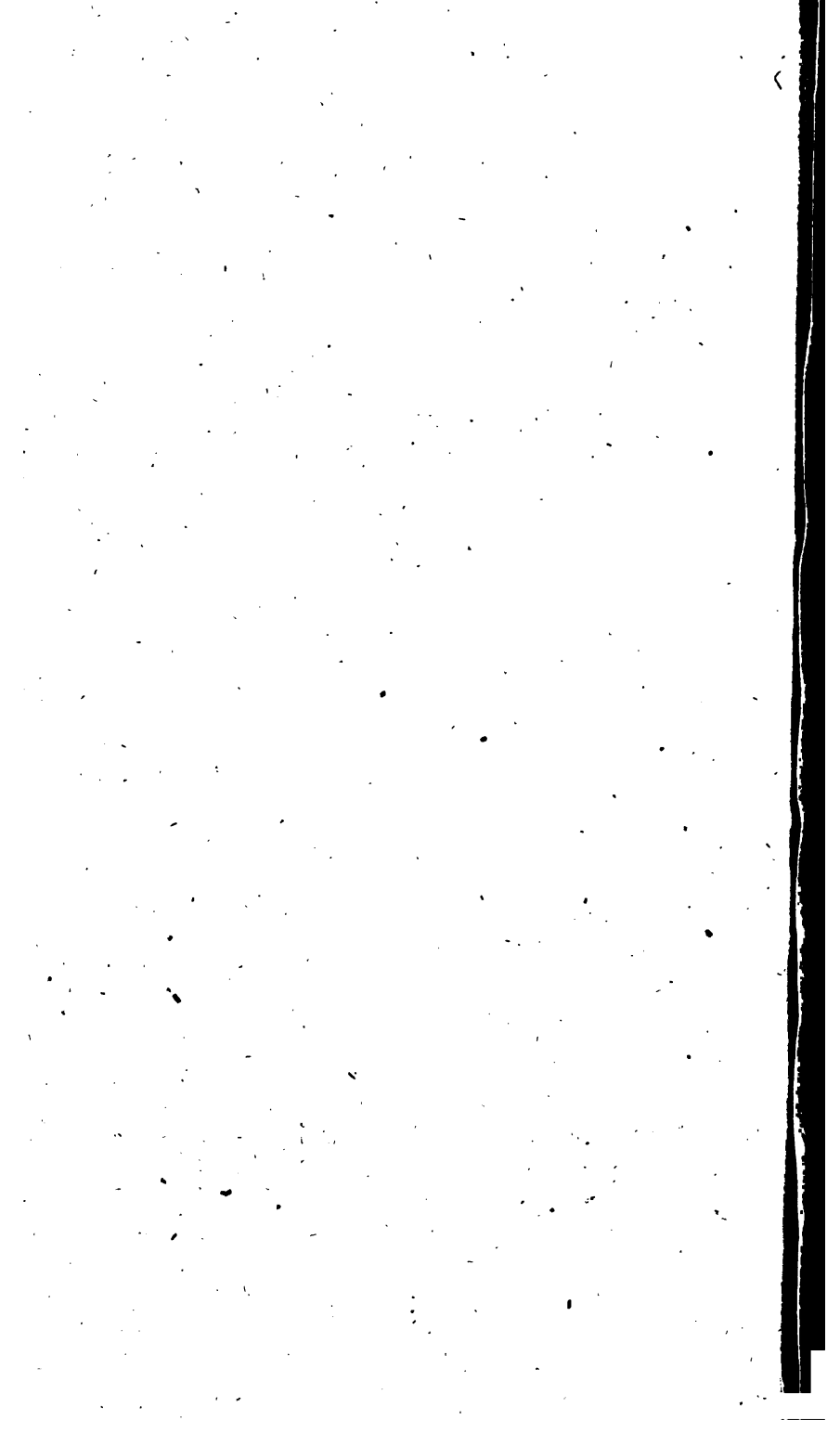


Fig. XIV.

Perspective Plate III.

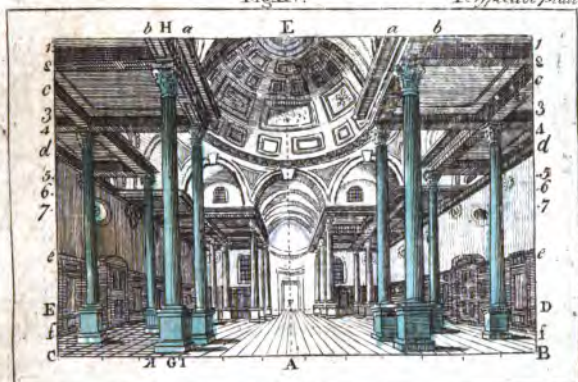


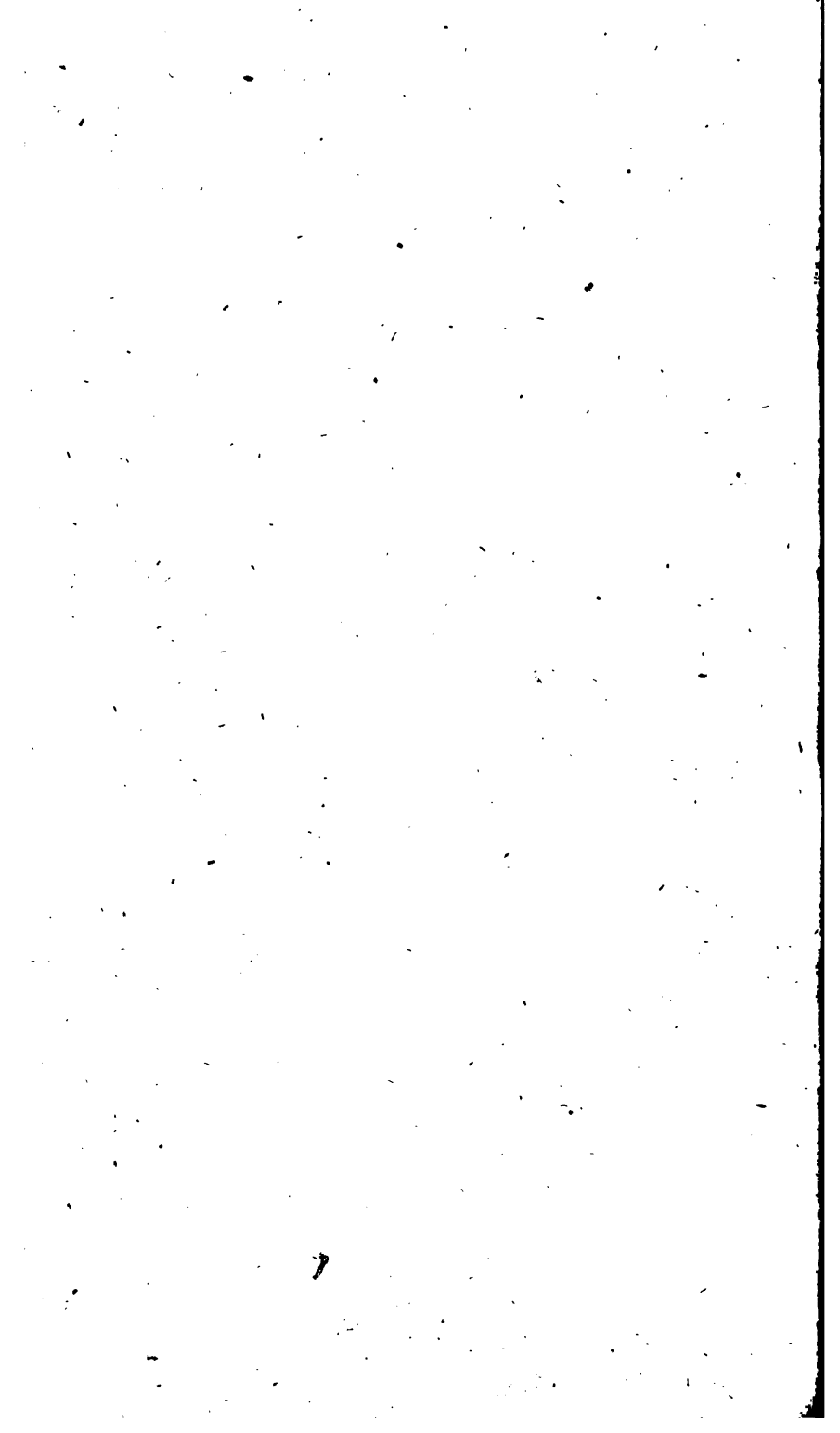
Fig. XV.

E

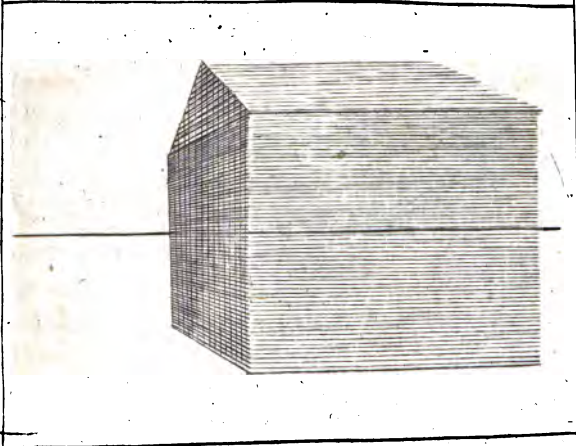
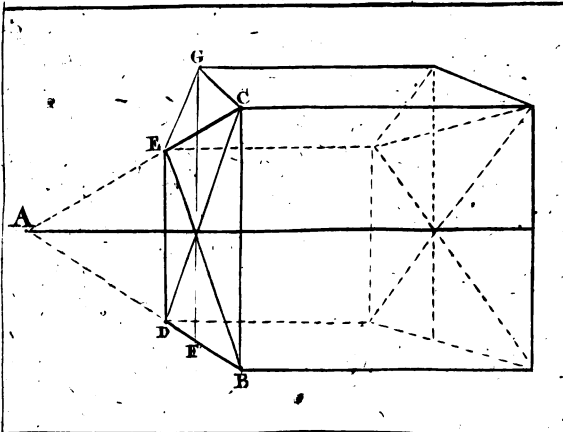


Fig. XVI.





Perspective Plate IV.



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same directions will shew the height of a figure at any other distance you have a mind to place it, as at *f*, *i*, and *m*, by ruling the parallels *f g*, *i k*, and *m n*; and from each of these their respective perpendiculars *g h*, *k l*, and *n o*; which perpendiculars will shew the heights of the figures at *f*, *i*, and *m*.

4. *To draw a direct view. See fig. XIV.*

To illustrate this example, suppose you were to draw the inside of a church, as represented in this figure: first take your station at the point *A*, in the centre of the base line *B C*, from which you have a front view of the whole body of the church, with all the pillars, &c. on each side; then fix your horizon at any height you think proper as at *D E*; bisect it by the perpendicular *E A*; and where these two lines intersect, is the point of sight *F*. (This perpendicular will pass through the centre of all the arches in the dome or cupola; which centres may be found by any three given points, as in fig. VII.) Next divide your base line into any given number of feet; and the visual lines ruled from these divisions to the point of sight, will reduce all your objects to their just proportion, by setting off their height upon a perpendicular raised at their respective distances. The base, in the example here given, is divided into twelve equal parts of five feet each; from which (supposing your front column to be thirty-five feet high) take seven divisions from the base line of your drawing, and set them off upon the perpendicular *G H*; then (supposing this column to be five feet thick at the base) set off one of those divisions upon the parallel *I K*, which is the breadth required. So that, by proportioning this scale to any distance by the foregoing directions, you may not only find the dimensions of all your columns, but also of every distinct part of them, as

well as of all the doors, windows, and other objects that occur. For instance; having found the height and breadth of your nearest column G, draw from the top and bottom of the said column to the point of sight the lines H F and K F; after which, rule the line I F from the base of the column to the point of sight, and you have the height and breadth of all the rest of the columns, as has been already shewn in fig. XII.

By ruling lines from the points a, b, c, d, &c. to the point of sight, you will see that all the summits and bases of your columns, doors, windows, &c. must tend immediately to that point; and by lines drawn from the points 1, 2, 3, 4, &c. on each side, to the correspondent points on the opposite side, may be seen all the parts of your building lying upon the same parallel.

5. *To draw an oblique view. See fig. XV.*

First, draw your horizontal line A B; then, if your favourite object be on the right hand, as at C, place yourself on the left hand upon the base line, as at D; then from that station erect a perpendicular D E, which will pass through the horizon at the point of sight F; to which rule the diagonals G F and H F, which will shew the roof and base of your principal building C; and will also, as before directed, serve as a standard for all the rest.

Observe also, either in direct or oblique views, whether the prospect before you makes a curve; for if it does, you must be careful to make the same curve in your drawing.

6. *To draw a perspective view, wherein are accidental points. See fig. XVI.*

Rule your horizontal line a b, and on one part of it fix your point of sight, as at c; from which rule the diagonals

c d and c e on the one side, and c f and c g on the other; which will shew the roofs and bases of all the houses in the street directly facing you; (supposing yourself placed at A in the center of the base line). Then fix your accidental points g and h upon the horizontal line, and rule from them to the angles i k and l m (where the streets on each side take a different direction, towards the accidental points g and h), and the lines g i and g k give the roofs and bases of all the buildings on one side, as l h and m h do on the other.

Accidental points seldom intervene where the distance is small, as in noblemen's seats, groves, canals, &c. which may be drawn by the strict rules of perspective; but where the prospect is extensive and varied, including mountains, bridges, castles, rivers, precipices, woods, cities, &c. it will require such an infinite number of accidental points, that it will be better to do them as nature shall dictate, and your ripened judgement approve.

7. *To find the centre for the roof of a house, in an oblique view.*
See plate IV.

Suppose from the point of sight A, the visual lines B A and A C be drawn, B C being one perpendicular given, and D E the other, rule the diagonals from D to C, and from E to B, and the perpendicular F G, raised through the point of their intersection, will shew the true centre of the roof, as will appear by ruling the lines G E and G C.

For want of being acquainted with this necessary rule, many, who have been well versed in other parts of perspective, have spoiled the look of their picture, by drawing the roofs of their houses out of their true perpendicular.

Perspective is either employed in representing the ichnographies, and ground-plots of objects as projective

planes; or in scenographics, and representations of the bodies themselves.

Ichtnography, in perspective, is the view of any thing cut off by a plain parallel to the horizon, just at the base or bottom of it; so that ichtnography is the same with what is otherwise called the plan, geometrical plan, or ground-plot of any thing.

Scenography, in perspective, is a representation of a body on a perspective plane; or a description thereof in all its dimensions, such as it appears to the eye. The ichtnography of a building, &c. represents the plan, or ground-work of the building. The orthography the front, or one of the sides; and the scenography the whole building, front, sides, height and all, raised on the geometrical plan.

Projection, in perspective, denotes the appearance or representation of an object on the perspective plane. The projection, e, g r, of a point, is a point through which the optick ray passes from the objective point through the plane to the eye; or it is the point wherein the plane cuts the optick ray. And hence is easily conceived what is meant by the projection of a line, a plane, or a solid.

The projection of the sphere in plane, is a representation of several points or places of the surface of the sphere, and of the circles described thereon, or of any assigned parts thereof, such as they appear to the eye situate at any given distance, upon a transparent plane placed between the eye and the sphere. The principal use of the projection of the sphere is in the construction of planispheres, and particularly maps and charts, which are said to be of this or that projection, according to the several situations of the eye, and the perspective plane with regard to the meridians, parallels, and other points and places to be represented. The projection of the sphere is usually divided into orthographic and stereographic.

Orthographic projection, is that wherein the superficies of the sphere is drawn on a plane, cutting it in the middle; the eye being placed at an infinite distance vertically to one of the hemispheres. The laws of this sort of projection are these: 1. The rays by which the eye at an infinite distance perceives any object, are parallel. 2. A right line perpendicular to the plane of the projection, is projected into a point, where that right line cuts the plane of the projection. 3. A right line not perpendicular, but either parallel or oblique to the plane of the projection, is projected into a right line, and is always comprehended between the extreme perpendiculars. 4. The projection of the right line is the greatest, when that line is parallel to the plane of the projection. 5. Hence it is evident, that a line parallel to the plane of the projection, is projected into a right line equal to itself; but if it be oblique to the plane of the projection, it is projected into one which is less. 6. A plane surface, at right angles to the plane of the projection, is projected into that right line, in which it cuts the plane of the projection. Hence it is evident, that a circle standing at right angles to the plane of the projection which passes through its centre, is projected into that diameter, in which it cuts the plane of the projection. 7. A circle parallel to the plane of the projection, is projected into a circle equal to itself; and a circle oblique to the plane of the projection, is projected into an ellipsis.

Stereographic projection, is that wherein the surface and circles of the sphere are drawn upon the plane of a great circle, the eye being in the pole of that circle. As to the properties of this sort of projection: 1. In this projection a right circle is projected into a line of half tangents. 2. The representation of a right circle perpendicularly opposed to the eye, will be a circle in the plane of the projection. 3. The representation of a circle placed obliquely

to the eye, will be a circle in the plane of projection. 4. If a great circle is to be projected on the plane of another great circle, its centre will lie in the line of measures, distant from the centre of the primitive by the tangent of its elevation above the plane of the primitive. 5. If a lesser circle, whose poles lie in the plane of the projection, were to be projected, the center of its representation would lie in the line of measures, distant from the centre of the primitive, by the secant of the lesser circle's distance from its pole, and its semi-diameter or radius be equal to the tangent of that distance. 6. If a lesser circle were to be projected, whose poles lie not in the plane of the projection, its diameter in the projection, if it falls on each side of the pole of the primitive, will be equal to the sum of the half tangents of its greatest and nearest distance from the pole of the primitive, set each way from the centre of the primitive in the line of measures. 7. If the lesser circle to be projected, falls entirely on one side of the pole of projection, and does not encompass it, then will all its diameter be equal to the difference of the half tangents of its greatest and nearest distance from the pole of the primitive, set off from the centre of the primitive one, and the same way in the line of measures. 8. In the stereographic projection, the angles made by the circles of the surface of the sphere, are equal to the angles made by their representation in the plane of their projection.

Of COLOURS.

The method of preparing the various kinds used in painting.

IT will now be proper to explain in an easy manner, the method of preparing the various bodies employed by painters, for producing the difference of light and shade;

which may be termed either pigments or fluids; as they are solid or aqueous; and are distinguished in their several kinds, according to the manner of working them; as oil-colours, water-colours, enamel-colours, &c. but their variety are too numerous to be in general use: most painters therefore select a set out of them, and become very unjustly prejudiced against those they reject. It is no little impediment to their improvement in the profession, that they are not more extensively acquainted with all the ingredients fit for their purposes.

Those colours which become transparent in oil, such as lake, Prussian blue, and brown pink, are frequently used without the admixture of white, or any other opaque pigment; by which means the tint of the ground on which they are laid retains, in some degree, its force; and the real colour, produced in painting, is the combined effect of both. This is called glazing; and the pigments endued with the property of becoming transparent in oil, are called glazing colours.

As colours are obtained from various substances, the means of preparing them are consequently various; some being of a simple nature, and requiring only to be purified and reduced to a proper consistence or texture; and others being compounds of different bodies, to be formed only by complex processes. It is therefore very difficult to give such general directions, for the making every sort of colour as may be intelligible to all; the utensils to be employed, as well as the methods to be pursued, being such as belong to different arts and trades.

Where, nevertheless, simple means, and the use of such utensils as are generally known, may be sufficient to perform what is wanting, it is best to avoid all technical terms, and more complex methods of operation, adopting such a mode of instruction as may be universally intelligible:—

We now proceed to the nature and preparation of the different colours, as they follow in their classes.

CLASS I.* OF RED COLOURS.

VERMILLION, is one of the most useful colours in every kind of painting; except enamel or on glass; as it is of a moderate price, spends to great advantage in any kind of work, and stands or holds its colour extremely well. It may be prepared in great perfection by the following process:

“ Take of quicksilver eighteen pounds, of flowers of
 “ sulphur six pounds: melt the sulphur in an earthen pot;
 “ and pour in the quicksilver gradually, being also gently
 “ warmed; and stir them well together, with the small
 “ end of a tobacco-pipe. But if, from the effervescence,
 “ on adding the latter quantities of the quicksilver, they
 “ take fire, extinguish it by throwing a wet cloth (which
 “ should be had ready) over the vessel. When the mass
 “ is cold, powder it, so that the several parts may be well
 “ mixed together. But it is not necessary to reduce it, by
 “ nicer levigation, to an impalpable state. Having then
 “ prepared an oblong glass body, or sublimator, by coating
 “ it well with fire-lute over the whole surface of the glass,
 “ and working a proper rim of the same round it, by

* CLASS I. RED.

Scarlet, or tending to the orange.

Vermillion.

Native cinabar.

Red lead.

Scarlet oker.

Common Indian red.

Spanish brown.

Terra di senna burnt.

Crimson, or tending to the purple.

Carmin.

Lake.

Rose pink.

Red oker.

Venetian red.

" which it may be hung in the furnace in such a manner
 " that one half of it may be exposed to the fire, fix it in
 " a proper furnace, and let the powdered mass be put
 " into it, so as to nearly fill the part that is within the
 " furnace; a piece of broken tile being laid over the
 " mouth of the glass. Sublime then the contents, with as
 " strong a heat as may be used without blowing the fumes
 " of the vermillion out of the mouth of the sublimer.
 " When the sublimation is over, which may be perceived
 " by the abatement of the heat towards the top of the body,
 " discontinue the fire; and, after the body is cold, take it
 " out of the furnace, and break it: collect then together
 " all the parts of the sublimed cake, separating carefully
 " from them any drops that may have been left at the
 " bottom of the body, as also any lighter substance that
 " may have formed in the neck, and appears to be dis-
 " similar to the rest. Levigate the more perfect part; and,
 " when reduced to fine powder, it will be vermillion proper
 " for use: but on the perfectness of levigation, depends,
 " in a great degree, the brightness and goodness of the
 " vermillion. In order therefore to perform this, it is
 " necessary that two or three mills of different closeness
 " should be employed, and the last should be of steel, and
 " set as finely as possible."

It is common, perhaps general, for dealers to sophisticate
 vermillion with red lead. But to detect with certainty the
 fraud, both with respect to the general fact, and the pro-
 portion, use the following means:

" Take a small, but known quantity of vermillion,
 " suspected to be adulterated, and put it into a crucible;
 " having first mixed with it about the same quantity, in
 " bulk, of charcoal dust: put the crucible into a common
 " fire, having first covered it with a lesser crucible inverted

" into it; and give a heat sufficient to fuse lead; when the
 " crucible, being taken out of the fire, should be well
 " shaken, by striking it against the ground. If the suspect-
 " ed adulteration has been practised, the lead will be found
 " reduced to its metalline state, in the bottom of the crucible;
 " and, being weighed, and compared with the quantity of
 " cinnabar that was put into the crucible, the proportion
 " of the adulteration may be thence certainly known.
 " But, if no lead be found in the crucible, it may be safely
 " inferred, that no red lead had been commixt with the
 " vermilion."

NATIVE CINNABAR,

Is found naturally formed in the earth, though seldom
 so pure as to be fit for the uses of painting, at least without
 being purified by sublimation. The mistaken notion that
 it would stand better than vermilion, because it was a na-
 tural production, has made it to be coveted by painters who
 are curious in colours. It is, however, not worth their
 while to be solicitous about it, as it never excelled the best
 vermilion in brightness; and what is generally sold for
 it is a pigment compounded of quicksilver and sulphur.

RED LEAD, or MINUM.

The goodness of red lead may be seen by its brightness,
 and a mixture of any kind will make it of a dull appear-
 ance. It is on this account not so liable to be sophisticated,
 as white lead or vermilion. It is lead calcined, till it ac-
 quires a proper degree of colour, by exposing it with a large
 surface to the fire.

SCARLET OKER,

Is an ochrous, earthy, or rather irony substance, and is the basis of green vitriol, separated from the acid of the vitriol by calcination. It is a kind of orange scarlet colour, and rivals any of the native okers, from its certainty of standing, and extreme strength and warmth, either as a ground, or in the shade of carnations. It is useful as a colour in any kind of painting; the manner of its preparation is as follows;

“ Take of green vitriol or copperas, any quantity; and
“ being put into a crucible, of which it will fill two thirds,
“ set it on a common fire to boil (taking care that it do
“ not boil over) till the matter be nearly dry; when it
“ will be greatly diminished in quantity. Fill then the
“ crucible to the same height again, and repeat the boiling
“ and replenishing, till the crucible be filled with dry
“ matter. Take it then from this fire, and put it into a
“ wind-furnace; or, if the quantity be small, it may be
“ continued in the same fire, the coals being heaped up
“ round it. Let the contents be calcined there till they
“ become of a red colour when cold; which must be exa-
“ mined by taking a little of the matter out of the middle,
“ and suffering it to cool; for so long as it remains hot,
“ the red colour will not appear, though it be sufficiently
“ calcined. When duly calcined, take the oker out of
“ the crucible while hot, and put it into water, in which
“ the parts of the broken crucible may be soaked likewise,
“ to obtain more easily what shall adhere to them; and stir
“ the oker well about in the water, that all the remaining
“ vitriol may be melted out of it. Let it then settle, and
“ when the water appears clear, pour it off, and add a fresh
“ quantity; taking out all the broken pieces of the crucible;

“ and proceed as before ; repeating several times this treatment with fresh quantities of water. Then purify the oker from any remaining foulness by washing over ; and having brought it to a proper state of dryness, by draining off the fluid by a filter, in which the paper must be covered with a linen cloth, lay it to dry on boards.”

COMMON INDIAN RED,

Is substituted in place of the real kind brought from the East-Indies : serving equally well for common purposes, giving a tint verging to scarlet, (varying from the true Indian red, which is greatly inclined to the purple), and on account of its warm, though not bright colour, it is much used, as well in finer as coarser paintings in oil. It is afforded cheap and may be thus managed :

“ Take of the caput mortuum, or oker, left in the iron pots after the distillation of aquafortis from nitre and vitriol, two parts, and of the caput mortuum or colcothar, left in the long necks after the distillation of oil of vitriol, one part ; break the lumps found among them, and put them into tubs with a good quantity of water ; and having let them stand for a day or two, frequently stirring them well about, lade off as much water as can be got clear from them ; and add a fresh quantity, repeating the same treatment till all the salts be washed out, and the water come off nearly insipid. The red powder which remains must then be washed over, and, being freed from the water, laid out to dry.

“ When this is designed for nicer purposes, it should be washed over again in basons, the gross manner of lading it out of one tub into another, not fitting it always completely to such ends.”

VENETIAN RED.

Useful to house-painters, in imitating mahogany, and is a native red oker inclining to scarlet, and easily prepared by mixing it with the colcothar or caput mortuum, taken out of the aquafortis pots and washed over. It requires no other preparation for use than to be well ground with oil, unless when it is used in miniature painting—when it should be washed over with the utmost care.

SPANISH BROWN,

Resembles the Venetian red very much in colour, but is fouler; it is a native pigment, and is used much in the same state nature produces it; being dug up in several parts of England. No other preparation is needful than freeing it well from stones and filth, and grinding it with oil to render it fit for colourmen, in the preparation of cloths for pictures, and other coarse work.

Calcined or burnt TERRA di SIENNA,

Is originally yellow; but, when moderately calcined, becomes an orange red, though not very bright. It is a native oker, brought hither from Italy in the state in which it is naturally found. It is calcined by putting lumps of it either in a crucible, or naked in a common fire, and continuing it there till the colour be changed from yellow to red. It is exceedingly useful in oil-painting, and admits of no adulteration: it may be distinguished from other ochrous earths by its semi-transparency.

CARMINE,

Is a bright crimson colour, of great advantage in painting, as well in water as varnish: the preparation of it is kept a secret by those who prepare it in perfection; and the superiority of the French carmine, shews that the proper method is wanting in England—though some wrongly attribute the excellence to qualities in the air and water of France. There are several recipes for this colour, but rather than insert imperfect instructions for an article of great consequence, we choose to be silent.

LAKE,

The best of what is commonly sold is made from the colour extracted from scarlet rags, and deposited on the cuttle-bone, which may be done in the following manner:

“ Take a pound of the best pearl-ashes, and, having
 “ dissolved them in two quarts of water, purify them by
 “ filtering through paper. Add then to this solution two
 “ more quarts of water, and having put in a pound of
 “ scarlet shreds, procured of the taylor, (which must be
 “ entirely clean), boil them in a pewter boiler, till the
 “ shreds appear to have wholly lost their scarlet colour.
 “ Take them out of the solution and press them well; dip-
 “ ping them after in water and pressing them again, that
 “ all the fluid they had imbibed may be got from them, in
 “ order to be put back to the rest. Take then another
 “ pound of the scarlet shreds, and repeat the like treat-
 “ ment of them in the same solution; as also a third and
 “ fourth pound. While this is doing dissolve a pound and

“ half of cuttle-fish-bone in a pound of strong aquafortis in
“ a glass receiver ; adding more of the bone, if it appear
“ to produce any ebullition in the aquafortis : and, having
“ strained off this solution through flannel, pour it into the
“ other by degrees ; observing whether it produce any
“ effervescence on putting in the last quantity : which if it
“ do in any great degree, more of the cuttle-fish-bone must
“ be dissolved in aquafortis : and the solution very gradu-
“ ally added till no ebullition appear to be raised by it in
“ the mixture. If this be properly managed, the fluid will
“ soon become clear and colourless, and the tinging parti-
“ cles, extracted from the shreds, together with the cuttle-
“ fish-bone, will subside to the bottom and form a crimson
“ sediment ; which is the lake. The water must then be
“ poured off ; and two gallons of hard spring water must
“ be put to the lake ; and well stirred about to mix them.
“ This being likewise poured off, after the lake has again
“ settled to the bottom, must be replaced by another two
“ gallons ; and the same method must be repeated four or
“ five times. But if hard water cannot be procured, or the
“ lake appear too purple, half an ounce of alum should be
“ added to each quantity of water before it be used. When
“ the lake is thus sufficiently freed from the salts, it must
“ have the water drained from it in a filter covered with a
“ linen cloth, which has been so worn as to have no nap
“ or down remaining on its surface. After the lake has
“ been drained to a proper dryness, it must be dropped on
“ clean boards, by means of a proper funnel : through
“ which, the drops being suffered to pass, and rest on the
“ board at proper distances, they will become small cones
“ or pyramids ; in which form the lake must be suffered to
“ dry, and the preparation is then completed.”

ROSE PINK.

The basis of this pigment is principally chalk; and the tinging substance extracted from Brafil, or Campeachy wood. It will not stand with oil or water, and is seldom employed but for the coarse work of house painters, or for paper hanging, unless secured from flying with varnish, when, if good, it may be substituted for lake. It is prepared as follows:

“ Take brafil wood six pounds, or three pounds of brafil
“ and three of peachy wood. Boil them an hour with
“ three gallons of water, in which a quarter of a pound of
“ alum is dissolved. Purify then the fluid by straining
“ through flannel; and put back the wood into the boiler
“ with the same quantity of alum, and proceed as before;
“ repeating this a third time. Mix then the three quantities of tincture together; and evaporate them till only
“ two quarts of fluid remain: which evaporation must be
“ performed first in the pewter boiler, and afterwards in a
“ balneo mariæ. Prepare in the mean time eight pounds
“ of chalk by washing over; a pound of alum being put
“ into the water used for that purpose, which, after the
“ chalk is washed, must be poured off and supplied by a
“ fresh quantity, till the chalk be freed from the salt formed by the alum; after which it must be dried to the consistence of stiff clay. The chalk and tincture, as above
“ prepared, must be then well mixed together by grinding;
“ and afterwards laid out to dry where neither the sun or
“ cold air can reach it; though, if it can be conveniently
“ done, a gentle heat may be used.”

RED OKER,

Is a native earth, brought chiefly from Oxfordshire, and burnt afterwards (by those who prepare it) in large ovens,

till by calcination it becomes red. It is very useful as well in the more delicate as coarser paintings in oil, for it stands infallibly. For nicer purposes it should be washed over; but for others it may be used in the state in which it is found in the shops.

CLASS II.* OF BLUE COLOURS.

ULTRAMARINE is a bright blue colour, of the highest value in every kind of painting; being equally serviceable in all, even in enamel. It has a transparent effect in oil, and in some degree in water, and will stand without the least hazard of flying. By reason of its high price, Prussian blue has been much introduced, to the prejudice of painting in general; as the skies of landscapes and many other parts of modern pictures, shew the loss of ultramarine, by their changing from a warm or clear blue, to a faint green or olive tint. The methods have been continually varied by those who have attempted to prepare this pigment. The following is the best of the more modern:

“ Take the lapis lazuli, and break it into very small
 “ pieces, or rather a gross powder; put it into a crucible,
 “ and cover it securely, to prevent the coals from falling
 “ amongst it. Calcine it then with a strong fire, for an
 “ hour, if there be any large quantity, or less time in pro-
 “ portion; quench it, when taken out of the fire, in
 “ vinegar, stirring them well together, and suffer it to re-

* CLASS II. BLUE.

Ultramarine.

Ultramarine ashes.

Prussian blue.

Verditer.

Cendre blue, or Sanders blue.

Indigo.

Smalt.

Bicc.

Litmus, or latmus,

" main in that state for a day or two. Pour off then the
 " vinegar, except what may be necessary for moistening the
 " calcined lapis lazuli in grinding; which operation it must
 " then undergo, in a mortar of flint or glass, till reduced
 " to the greatest degree of fineness those means may effect.
 " But, if it appear yet too hard to be easily ground, give
 " it another short calcination, and quench it a second time
 " in vinegar. The vinegar must then be washed off from
 " the powder, by the putting to it several successive quanti-
 " ties of clean water; each of which must be poured off
 " when the lapis lazuli has been well stirred about in them,
 " and is again settled to the bottom. It must then be
 " ground on a porphyry stone, with a mullar, till it be
 " perfectly impalpable, and then dried; in which state it is
 " duly prepared to mix with the following cement. Take
 " of Burgundy pitch nine ounces of white resin, and
 " Venice turpentine, six ounces of virgin wax one ounce
 " and half and of linseed oil one ounce and a quarter;
 " mix them together by melting in a pipkin over the fire;
 " and suffer them to boil till they acquire so stiff a con-
 " sistence, that being dropt into water while of this boiling
 " heat, they will not spread on the surface of it, but form a
 " roundish mass or lump. The cement being thus formed,
 " may be poured out of the pipkin in the water, and made
 " into cakes or rolls for use. Of this cement, take an
 " equal weight with that of the calcined lapis lazuli and
 " melt it in a glazed earthen pipkin; but not so as to ren-
 " der it too fluid. Then add to it the calcined matter by
 " very slow degrees; stirring them together with an ivory
 " spatula, till the whole appear perfectly mixed. Being
 " thus mixed, heat the composition to a something greater
 " degree, and cast it into a large basin full of cold water.
 " When it has cooled to a consistence to bear such treat-

ment, knead it well like the dough of bread, with the hands rubbed over with linseed oil, till all the parts be thoroughly incorporated with each other. Then make the mass into a cake, which may be either kept till some other convenient time in cold water, or immediately proceeded with in the following manner: put the cake into an earthen dish or basin, the bottom of which should be rubbed with linseed oil; and pour on it water of the warmth of blood. Let it stand a quarter of an hour; and, as the water softens the cake, it will let loose the finest part of the calcined matter, which, on gently stirring the water, but without breaking the cake, or separating it into lesser parts, will be suspended in the water, and must be poured off with it into another vessel. The quantity of water must be then renewed, and the same operation repeated a second or third time: and, as the mass appears slack, in affording the colour, it must be moved and stirred, in the manner of kneading, with the ivory spatula, but not broken into fragments or small parts; and when so much of the colour is extracted, as to render it necessary for the obtaining more, the heat of the water must be increased to the greatest degree. The quantities of the calcined matter (which is now the ultramarine) that were first washed off, and appear of the same degree of deepness and brightness, may be put together; and the same of those of the second degree; the last washings making a third. The water being then poured off from each of these parcels, put on a lixivium formed of two ounces of salt of tartar, or pearl-ashes, dissolved in a pint of water, and filtered through paper after the solution is cold. This lixivium must be put on boiling hot, and the ultramarine stirred well about in it; and then the mixture set to cool. The powder being subsided, the clear lixivium must be poured off, and clean

“ water put in its place; which must be repeated till the
 “ whole of the salts of the lixivium are washed away. The
 “ ultramarine must afterwards be dried; and will be then
 “ duly prepared for use.”

Ultramarine is subject to be adulterated, on account of its great price. This is frequently done by a precipitation of copper, made by alkaline salt, and is very injurious; because the magistery of copper (if the ultramarine sophisticated with it be used in painting, either with oil or water) will change its hue and turn black. And, in enamel painting, as soon as fluxed, it will become a green, and consequently make the effect of the ultramarine vary from what is intended. This fraud may be easily detected by pouring some diluted spirit of nitre on a small quantity; which, if there be any copper, will soon dissolve, and form a greenish blue solution.

ULTRAMARINE ASHES.

After the ultramarine has been extracted from the lapis lazuli, the residuum or remains form this pigment. And when the operation of extracting the colour has not succeeded well, a considerable share of the ultramarine is left behind with the recement, and greatly enhances the worth of the ashes; for of course the value of the latter is inferior to the former, but it is still subject to adulteration, which may be discovered by putting some of it into a small quantity of spirit of nitre, and if there be any copper in it, it will be tinged green. It is prepared as follows:

“ Take the cement of the ultramarine, which remains
 “ after the colour is extracted, and mix it with four times
 “ its weight of linseed oil. Let the mixture be set in a
 “ glazed pipkin over the fire, and when it is thus boiled a
 “ short time, put it into a glass vessel sufficiently large to

“ contain it, of a cylindrical figure: of which vessel the
“ diameter must be small in proportion to the length. But
“ care must be taken, that the matter, when put into this
“ glass, be cool enough not to endanger the breaking it.
“ This glass must then be put into a *balneum mariæ*,
“ which must be made as hot as possible without boiling,
“ and kept there till the colour appears to be all subsided
“ to the bottom. The oil must then be poured off, till
“ the colour appears to rise with it; and the remainder,
“ with the colour in it, must be put into another glass of
“ the same kind with as much fresh oil as will rise five or
“ six inches above the colour. This glass must be treated
“ in the same manner as the first: observing when the
“ colour has subsided, the oil must be poured off, and a
“ fresh quantity put in its place. This having been like-
“ wise poured off, the colour must then be well washed,
“ to free it from the remaining oil, first in boiling water,
“ and afterwards in some of the *lixivium* abovementioned,
“ made boiling hot also. As much of the *lixivium* being
“ poured off, when the colour has subsided, as can be se-
“ parated from it that way, the colour must be thoroughly
“ freed from the remainder by frequent ablutions with
“ clean water: after which the water must be taken off
“ by the means above directed for the *ultramarine*, till the
“ matter be of a proper degree of moisture for grinding. It
“ must then be thoroughly well ground on a *porphyry*, and
“ washed over; that all the harder and insufficiently cal-
“ cined parts may be reduced to an impalpable powder;
“ in order to which, the remaining grosser parts, after the
“ finer have been separated by the washing over, must be
“ again ground till the whole be perfectly fine. The
“ same means must be afterwards used to bring the ashes to
“ a dry powder that were before directed for the *ultra-*
“ *marine*.”

PRUSSIAN BLUE,

Is the earth of alum, combined with the fixed sulphur of animal or vegetable coal; and may be made from almost any animal substance; but it is generally made of the coal of blood only. It is useful in all kinds of painting, save enamel; and prepared to different degrees of brightness and strength. The common kind found in the shops, and sold at very low prices, can be little depended upon in paintings of consequence; therefore it should be prepared perfect, and in the true manner: and then, considering the high price of ultramarine and the foulness of the indigo, it may be truly deemed a very valuable acquisition to the art of painting.

“ Take of blood any quantity; and evaporate it to perfect dryness. Of this dry blood, powdered, take six pounds, and of the best pearl-ashes two pounds: mix them well together in a glass or stone mortar; and then put the mixt matter into large crucibles or earthen pots; and calcine it in a furnace; the top of the crucible or pot being covered with a tile, or other such convenient thing, but not luted. The calcination should be continued, so long as any flame appears to issue from the matter; or rather till the flame become slender and blue; for if the fire be very strong, a small flame would arise for a very long time, and a great part of the tinging matter would be dissipated and lost. When the matter has been sufficiently calcined, take the vessels which contain it out of the fire; and, as quickly as possible, throw it into two or three gallons of water; and, as it soaks there, break it with a wooden spatula, that no lumps may remain. Put it then into a proper tin vessel, and boil it for the space of three quarters of an hour or more.

“ Filter it while hot through paper in tin cullenders, and
“ pass some water through the filter when it is run dry,
“ to wash out the remainder of the lixivium of the blood
“ and pearl-ashes; the earth remaining in the filter may
“ be then thrown away. In the mean time, dissolve
“ of clean alum four pounds, and of green vitriol or cop-
“ peras two pounds, in three gallons of water. Add this
“ solution gradually to the filtered lixivium, so long as any
“ effervescence appears to arise on the mixture; but, when
“ no ebullition or ferment follows the admixture, cease to
“ put in more. Let the mixture then stand at rest, and
“ a green powder will be precipitated: from which, when
“ it has thoroughly subsided, the clear part of the fluid
“ must be poured off, and fresh water put in its place, and
“ stirred well about with the green powder; and, after a
“ proper time of settling, this water must be poured off
“ like the first. Take then of spirit of salt double the
“ weight of the green vitriol which was contained in the
“ quantity of solution of vitriol and alum, added to the
“ lixivium, which will soon turn the green matter to a blue
“ colour; and, after some time, add a proper quantity of
“ water, and wash the colour in the same manner as has
“ been directed for lake, &c. and, when properly washed,
“ proceed in the same manner to dry it in lumps of con-
“ venient size.”

The brightness, deepness, and coolness of Prussian blue, are proofs of its goodness; for with these qualities it may be depended upon in standing well. Sophistication, or any thing amiss in the process, may be seen by its being more foul and purple.

VERDITER,

Is formed by adding a due proportion of chalk to a solution of copper, made by refiners in precipitating the silver from the aquafortis, in the operation called parting. Verditer is to be had at a cheap rate from the refiners, who are at no expence in making it, but that of the chalk and labour. The manner in which it may be best done by them is as follows:

“ Take any quantity of chalk, and having rendered it
 “ sufficiently fine by washing over carefully, add it gradually to the solution of copper, so long as any change
 “ appears to be produced by it from the ebullition excited;
 “ or the due proportion may be perceived by the fluid
 “ losing its green tinge and becoming colourless. Let it
 “ then stand at rest till the sediment be subsided, and pour
 “ off the clear part of the fluid from the powder; adding
 “ in it its place clean water, which must be several times
 “ renewed till the salts be entirely washed out. The
 “ sediment, which is the verditer, must be afterwards freed
 “ from the fluid by filtering through paper covered with
 “ a cloth, and laid out in lumps of a middling size to dry.”

Those who desire to make verditer themselves, may prepare the solution of copper, by adding copper filings gradually to aquafortis of any kind, or putting plates of copper in it; and then proceeding as is above directed for the refiner's solution.

BLEU *de* CENDRES; or SANDERS BLUE.

If enquiry is made at the colour shops for this article, nothing is to be found under the name but common verditer, or a species of it where the precipitation of the copper

appears to be made in part upon starch as well as chalk. It may be prepared as follows :

“ Take of the refiners solution of copper made in the precipitation of silver from the spirit of nitre ; or dissolve copper in spirit of nitre or aquafortis, by throwing in filings or putting in slips of copper gradually, till all effervescence cease. Add to it of starch finely powdered, the proportion of one fifth or sixth of the weight of the copper dissolved. Make then a solution of pearl ashes, and filter it; and put gradually, to the solution of copper, as much as will precipitate the whole of the copper; which may be known by the fluid's becoming clear and colourless, though before highly tinged with green. Wash the powder, which will be precipitated, in the manner directed for lake, &c. and, when it is so well drained of water by means of a filter, as to be of a proper consistence, grind the whole well together, and lay it out to dry.”

INDIGO.

This was formerly almost the only blue colour used in painting. It is made in the Spanish West-Indies, by means of putrefaction from certain plants, and a coagulation by the air. It cannot (as far as is hitherto known) be prepared in these colder climates, on account of the tender nature of the plants which produce it. The indigo brought from the French, or our own plantations, is foul, and greatly inferior in brightness to that formerly imported hither from the Spaniards, it being equal to the Prussian blue for some purposes; and there is no other preparation necessary to using it in painting, except a perfect levigation.

SMALT.

Smalt is made from glass ground to a powder, and coloured with zaffer; or prepared from fluxing to the proportion of glass, one seventh part of zaffer, or more or less, according to the degree of deepness required. It will not work with either brush or pencil; but, by strewing it upon any ground of oil-paint while wet, it makes a bright blue shining surface, proper for large sun-dials, and other such applications. In enamel-painting, and in painting on glass, it is of great use.

BICE.

At present several compositions of indigo and verditer with chalk, and other cheap substances, are sold in this name; but the true kind is smalt, reduced to a fine powder by levigation. From its unsuitable texture, it is now greatly disused, or it makes a light warm blue colour, and was formerly used in oil, but more frequently in water-colours.

LITMUS or LATMUS.

Water painting is the only kind in which this can be used, and as it is brought from Holland at a very cheap rate, it were almost needless to give the preparation. But if any are desirous, for curiosity, to know the process, it is formed from archal, a species of moss, brought from the Canary and Cape de Verd Islands, and prepared as follows:
“ Add quick lime and putrified urine, or spirit of urine
“ distilled from lime, to the archal, previously bruised by
“ grinding. This mixture must be suffered to stand till it

“ acquires a very blue colour. After which the fluid must
 “ be suffered to evaporate, and the remaining mass, when
 “ it is of the consistence of a paste, must be laid on boards
 “ to dry in square lumps.”

If it is used in miniature paintings, care must be taken of the approach of acid, for that changes it instantly from blue to red; though it will stand if no such accident intervene.

CLASS III.* *Of* YELLOW COLOURS.

KING's yellow, when prepared well (which must be done by mixing sulphur and arsenic by sublimation) is an extremely bright colour, and a true yellow; but when mixed with white lead, and several other pigments, its colour flies or changes: this defect, joined to its nauseous smell, and the notion of its being a strong poison, renders it unpleasing, and causes it to be rejected by many. Nevertheless, it may be used on many occasions, with great advantage, not only as a yellow, but by mixing it with blue pigments, and forming a green. King's yellow is prepared as follows:

“ Take of arsenic powdered, and flowers of sulphur,
 “ in the proportion of twenty of the first to one of the

* CLASS III. YELLOW.

King's yellow.

Naples yellow.

Yellow oker.

Dutch pink.

English pink.

Light pink.

Gamboge.

Masticot.

Common orpiment.

Gall stones.

Terra di Sienna unburnt.

Turpeth mineral.

Yellow berry wash.

Turmeric wash.

Zedoary wash.

Tincture of saffron.

“ second: and having put them into a sublimer, sublime
“ them in a sand heat. The operation being over, the
“ king’s yellow will be found in the upper part of the glass,
“ which must be carefully separated from any caput
“ mortuum, or foul parts that may be found in the glass
“ with it. It must be afterwards reduced to an equal
“ powder by levigation.”

NAPLES YELLOW.

The neighbourhood of Naples is said to produce this pigment naturally: of the truth of this we are dubious, but certain that it is brought from abroad. It is a yellow rather inclining to the orange; seldom used but in oil painting, where it is generally found to stand well. It is brighter than other yellows at present in use, except the king’s yellow; but if it touch iron along with the least watry moisture, it will be changed by it, for which reason care should be taken to employ an ivory spatula, instead of a pallet knife, during the grinding of it with oil, which is the only preparation practised on it, as it does not well bear levigation with water.

YELLOW OKER.

The substance of this is a mineral earth, found in different places, of various degrees of purity. There is no other preparation necessary but levigation, and freeing it properly from dirt and other matter. It is a valuable colour, being a true yellow that will not fly in the least, and its texture suits it for all kinds of painting. Notwithstanding its utility it ought to be of low price.

DUTCH PINK.

As this colour will not bear well to be worked in oil, nor can be depended upon with regard to its standing, it is used principally for coarser purposes in water, and is sometimes prepared in the same manner with starch and white lead; but the following preparation is very cheap and easy, and makes it to perfection:

“Take of French berries one pound, and of turmeric root powdered four ounces; boil them in a gallon of water two hours, and then strain off the tincture through flannel, and boil it again with an ounce of alum till it be evaporated to one quart. Prepare in the mean time four pounds of chalk, by washing it over, and afterwards drying it, and mix the chalk with the tincture, by grinding them together; and then lay out the Dutch pink thus made to dry on boards.”

As it should be a full gold coloured yellow and very bright, any adulteration may be discovered by the eye*.

ENGLISH PINK.

Prepare this in the same manner, and with the same ingredients as the Dutch, only increasing the quantity of chalk, to render it of an inferior quality; it being the same, only lighter and coarser.

LIGHT PINK.

The only kind fit for use in oil painting is prepared in the following manner:

“Take of French berries one pound, boil them with a gallon of water for an hour; and having strained off

* Acid of sugar poured on a dissolution of martial vitriol produces a yellow precipitate, superior to Dutch pink.

" the fluid, add to it two pounds of pearl ashes, dissolved
 " and purified by filtering through paper. Precipitate
 " with alum dissolved in water, by adding the solution
 " gradually, so long as any ebullition shall appear to be
 " raised in the mixture. When the sediment has thoroughly
 " subsided, pour off the water from it, and wash it with
 " several renewed quantities of water, proceeding as has
 " been before directed in the case of the lake, &c. drain off
 " the remaining fluid in a filter with a paper covered with
 " a linen cloth; and, lastly, dry it on boards in small
 " square pieces."

GAMBOGE.

No yellow is of greater service in water colours; easily
 dissolving to a milky consistence, from the state in which it
 arrives. It is a gum produced in the East Indies, and
 nothing but the addition of water is wanting to prepare it
 for use.

MASTICOT.

As this is not a very bright colour it is little used; or it
 will stand perfectly in oil or in water; it works with the
 pencil better than most other pigments, and certainly might
 be made very useful by putting flake white, or white lead,
 on an earthen or stone dish before a strong fire; and con-
 tinuing it there till the colour be sufficiently yellow. The
 calcination being finished, the parts which are of the desired
 tint must be picked out from the rest and put together.
 For with the greatest care, it is difficult to calcine the whole
 equally. Grinding with oil is the only preparation ne-
 cessary to the using of it.

COMMON ORPIMENT.

It is generally disagreeable to meddle with this, on account of its nauseous smell and poisonous quality; being a fossil body composed of arsenic and sulphur, with a mixture frequently of lead, and sometimes other metals. In its unrefined state it is only useful to colour the matted bottoms of chairs, or other coarse work; but if purified by sublimation it becomes king's yellow.

GALL STONES.

The real kind are found in the gall bladder or like ducts of beasts; and require nothing more than rubbing with water (as gamboge) to dissolve them to a dark warm yellow. But as these are not always to be procured, a fictitious kind, of equal service, may be made as follows:

“ Take a quart of the bile of oxen, as fresh as possible.
 “ Put it into a proper pewter vessel, and set it to boil in a
 “ balneo mariæ; having added to it a quarter of an ounce
 “ of clear gum arabic. Evaporate the whole to about an
 “ eighth; and then remove it into a china cup or basin of
 “ proper size, and evaporate it to dryness; collecting it
 “ into a mass as it becomes of a stiff consistence.”

TERRA *di SIENNA unburnt.*

Mention has been made of this pigment being a native ochrous earth, brought from Italy; that calcination changes it from yellow to red: therefore those that choose to use it as a yellow, should take care to have it extremely well

levigated, as it will serve for a deeper shade by many degrees than any of the other okers, and of a superior brightness,

TURPETH MINERAL.

* This for use is much such another colour in yellow as vermillion in red, and will stand equally well with that. It is a preparation of mercury, by calcining it together with oil of vitriol, and is much brighter than any other yellow used in oil, except king's yellow. The preparation :

“ Take of pure quicksilver, and oil of vitriol, each six
 “ pounds. Put them into a retort, to which, (being placed
 “ in a sand bath), fit on a receiver, and distil them with a
 “ strong fire, while any fumes appear to rise into the
 “ receiver; urging it at last with as great a heat as the
 “ furnace will bear. When the retort is again cold, re-
 “ move it out of the sand bath; and having broken it, take
 “ the white mass, which will be found at the bottom of it,
 “ and break it to a gross powder, and having put it in a
 “ glass mortar, pour water on it, which will immediately
 “ convert it to a yellow colour. Let it next be thoroughly
 “ ground in this mortar, with water, and afterwards washed
 “ with several successive quantities. It must then be
 “ thoroughly well levigated on a stone, and dried.”

The YELLOW WASH, from the French berries.

“ Take a pound of the French berries, and put to them
 “ a gallon of water, with half an ounce of alum: boil them
 “ an hour in a pewter vessel, and then filter off the fluid,
 “ through paper, if it be designed for nicer purposes, or

“ flannel for more ordinary. Put them again into the
“ boiler, and evaporate the fluid till the colour appears of
“ the strength desired; or part may be taken out while less
“ strong, and the rest evaporated to a proper body.”

It may be used in water as a washing colour, and is applicable to many material purposes, as it may be made of almost any degree of deepness,

TURMERIC WASH.

The gum made from the turmeric-root dissolved in water, serves for the same purposes of the yellow-berry-wash; but to procure a bright tincture, it must be dissolved in spirit of wine instead of water, by the following method:

“ Take two ounces of proof spirit, and add to it one
“ ounce of water. Being put into a proper phial, add two
“ drams of turmeric root in powder. Shake them well together, and then let them stand three or four days, repeating the shaking as often as convenient; and a strong
“ tincture will be thus obtained.”

TINCTURE of SAFFRON.

It makes a good shade for gamboge or other light bright yellows: by pouring hot water on the best English saffron in a proper phial or other vessel; which should be placed for some time in a heat next to that which would make water boil; and the tincture should then be filtered from the dregs through a piece of linen cloth.

ZEDOARY WASH.

Take an ounce of zedoary-root, and boil it in a quart of water till the water appears sufficiently tinged to a yellow:

strain it through linen and it will be a stronger colour than can be made of turmeric without spirits of wine, and is valuable for many purposes in painting with water colours, as flowers, yellow draperies, &c.

CLASS IV.* OF GREEN COLOURS.

VERDIGRISE.

LET the pulp of grapes or any such acid remain upon copper; and the rust formed by its corrosive action is verdigrise. It is brought from France and Italy hither, and makes a blue-green colour in paint; but will not stand in oil. It should have a small admixture of yellow to render it a true green.

CHRYSTALS of VERDIGRISE; *called*

DISTILLED VERDIGRISE.

“ Take of the best verdigrise four ounces, and of distilled vinegar two quarts. The verdigrise being well
 “ pounded, let them be put into a circulating vessel, that
 “ may be formed of a matrafs (which is a round bodied
 “ glass with a long straight neck) and a Florence flask;
 “ which must have its neck inverted into the matrafs, the
 “ thick end being broken off. This circulating vessel must
 “ be placed in a gentle sand-heat, or other warm situation,
 “ where it must continue, being frequently shaken, till the
 “ vinegar has dissolved as much as it can of the verdigrise.
 “ Remove the verdigrise and vinegar then into a proper

* CLASS IV. GREEN.

Verdigrise.

Prussian green.

Distilled verdigrise, or chrystals
 of verdigrise.

Terra verte.

Sap green.

“ glass for decanting the fluid, when it shall become clear
“ from the sediment ; and when it has stood a due time to
“ settle, let it be carefully poured off and evaporated to
“ about half a pint ; which is best done with a sand-heat,
“ in a glass body or cucurbit, having its neck cut off to
“ form a wide mouth. It may be set to shoot in the same
“ vessel, or in a glass receiver with a wide neck ; and
“ when the chrystals are formed, they must be taken out
“ and carefully dried in the shade.

“ A fresh proportion of vinegar may be added to the re-
“ mains of the verdigrise ; and at the same time the first
“ quantity left undissolved ; and the mothers, or fluid re-
“ maining after the chrystals were formed, may be put into
“ it ; by which means, the other parts of the process being
“ repeated, a second quantity of the chrystals may be ob-
“ tained.”

The chrystals made thus are of a bright green colour, and if used with varnish so as to stand, have a fine effect ; but they will not hold their colour very well in oil, being apt to turn black.

SAP GREEN,

Is made of the juice of buckthorn berries, and is very useful in water painting as a washing colour, making a strong and pretty deep stain. It is prepared as follows :

“ Take any quantity of buckthorn berries before they
“ be ripe, and press out the juice in such a press as is used
“ for making cyder or verjuice ; or by any other method.
“ Strain this juice through flannel, then let it stand to
“ settle ; and when it has stood a proper time, decant off
“ the clearer part of the fluid from the sediment. Put this
“ juice into a stone or earthen vessel, and evaporate it till
“ it begins to grow of a thick consistence ; then remove it

“ into a pewter vessel, and finish the evaporation in a balneo
 “ mariae, collecting the matter into one mass as it acquires
 “ a proper consistence.”

PRUSSIAN GREEN.

This colour is much neglected, and seems almost wholly laid aside, or it has nearly all the uses in its colour that the Prussian blue has, only not so bright; nor will it stand so well; yet it might be of advantage in many kinds of painting. To make it,

“ Proceed in all points as in the process given for the
 “ Prussian blue, till the solution of alum and vitriol be
 “ mixed with that of the pearl-ashes and sulphur of the
 “ coal, and the green precipitation made. Then, instead
 “ of adding the spirit of salt, omit any further mixture, and
 “ go on to wash the sediment, which is the Prussian green;
 “ and afterwards dry it, in the same manner as is directed for the blue.”

TERRA VERTE.

This is supposed to be a native earth, brought from abroad, of a coarse texture, requires to be well levigated and washed over; but no other preparation is necessary previous to its use,

CLASS V.* OF PURPLE COLOURS.

The true INDIAN RED.

PERHAPS it may be no easy matter to procure this colour true; for it is a native ochrous earth, very useful in

* CLASS V. PURPLE.

True Indian red.

Archal, or orchal.

oil, in its compounded state, as well for force in its effect as certainty of standing. But the fictitious kind, now fallaciously called by its name, has no good property as a purple: in short, it is varied into a broken orange, and rejected by most colourmen and painters. The true kind needs no other preparation than grinding or washing over.

ARCHAL, or ORCHAL.

This may be made in a very easy manner by those who cannot procure it of the manufacturers; and is an extreme bright purple fluid, but apt to dry to a reddish brown, and therefore much disused at present. To prepare it,

“ Take an ounce of the archal weed or moss, as it is sold
 “ at the dry-falters; and, having bruised it well, put it into
 “ a glass phial with half a pint of weak spirit of sal ammo-
 “ niacus distilled with lime. Stop the phial close, and leave
 “ the archal to infuse till a strong bluish purple tincture be
 “ formed.”

CLASS VI.* OF BROWN COLOURS.

BROWN PINK.

AMONG the variety of methods for preparing this pigment, the following is one of the best:

“ Take of French berries one pound; of fustic wood in
 “ chips half a pound, and of pearl ashes one pound. Boil
 “ them in a tin boiler, with a gallon and a half of water,
 “ for an hour; and then strain off the tincture through

* CLASS VI. BROWN.

Brown pink.

Blütre.

Brown oker.

Cologn, or Collin's earth.

Terra japonica, or japan earth.

Umbre.

Asphaltum.

Spanish juice, or extract of liquorice.

“ flannel while the fluid is boiling hot. Having prepared,
 “ in the mean time, a solution of a pound and a half of
 “ alum, put it gradually to the tincture, so long as an ebul-
 “ lition shall appear. Proceed then to wash the sediment
 “ as in the manner directed for the lakes; and being
 “ brought, by filtering through paper with a linen cloth,
 “ to a proper consistence, dry it on boards in square
 “ pieces.”

Its goodness may be judged of by its transparency, in every quality but that of standing, which can only be known on trial.

BISTRE.

This colour is extremely serviceable in water, if procured good, which may be done by the following recipe :

“ Take any quantity of foot of dry wood, but let it be
 “ of beech wherever that can be procured. Put it into
 “ water in the proportion of two pounds to a gallon; and
 “ boil them half an hour. Then, after the fluid has stood
 “ some little time to settle, but while yet hot, pour off the
 “ clearer part from the earthy sediment at the bottom; and
 “ if, on standing longer, it form another earthy sediment,
 “ repeat the same method: but this should be done only
 “ while the fluid remains hot. Evaporate then the fluid to
 “ dryness, and what remains will be good bistre, if the
 “ foot was of a proper kind.”

BROWN OKER.

After procuring this substance of fossil earth from the colourmen, which may be done at a very low price, care should be taken to have it well levigated and washed over; when it may be used for a foul orange colour, and may be depended on for standing well.

COLOGN, *or* COLLIN'S EARTH.

Where the fore-ground of a water painting requires to be pretty strong, the Cologn earth may be used to advantage. It requires no preparation, save grinding perfectly fine with water; it being of a fossil substance, and a dark blackish brown colour.

TERRA JAPONICA, *or* JAPAN EARTH.

A fall brown colour is produced from this gummy substance, by dissolving it with water; but it will not mix well with oil. It is extracted from some kind of vegetable, and its goodness may be distinguished by the clearness of its colour.

UMBRE.

It has the quality of the other ochrous earthy substances, joined to that of drying better, which occasions it to be much used in making drying oils, japaner's gold size, and the black oil lacker. In painting some few use it with water; but before it is fit for that purpose it should be burnt, levigated and washed over.

ASPHALTUM.

There is an additional advantage in this colour, when used in lieu of brown pink: It is secure from flying, and retains in drying a transparent brown. If it can be procured pure as it is found in the earth in Asia, it is certainly very useful; but it is a bituminous matter, of a consistence like tar, and liable to be adulterated with turpentine and other cheap balsamic substances; which fraud is not easy to

be detected, unless by the mixture taking off the native transparent, and deep brown colour, which the eye may discover.

SPANISH JUICE, *or* EXTRACT of LIQUORICE.

The liquorice root is extracted by a decoction in water, and then evaporated to a well known consistence. In miniature painting it is at this time much used. It supplies the place of bistre in a great measure, though it is inferior; but there is no trouble in procuring, nor process in preparing the liquorice that is ever wanted in England.

CLASS VII.* *Of* WHITE COLOURS.

WHITE FLAKE is brought here from Italy; it is used for oil or varnish painting, where a very clean white is required; and is a kind of cerufs or lead corroded by acid.

There is a great deal sold at the colour shops ready prepared; that is, the true kind levigated, mixed with starch or some such substance. But it is best to procure the white flake in a lump, and then levigate it, and if it is thought proper, add any quantity of starch in the grinding, that may render it suitable to work with.

WHITE LEAD,

Is a corrosion by acid from plates of lead, prepared by those who are concerned in it at a low price. It is much

* CLASS VII. WHITE.

White flake,
White lead.
Calcined hartshorn.

Pearl white.
Troy white.
Egg-shell white.

employed in common purposes of painting, and may be used in nicer ; but will require washing over, and then it is little inferior to flake white. Notwithstanding its cheapness, it is frequently adulterated by the makers or wholesale dealers, by adding chalk or powdered talc, which may be seen by comparing a pure piece with a suspected one ; as the fraud will appear by the difference of the weight. But to prove it more exactly use the following means :

“ Take an ounce of the white lead suspected ; and mix
 “ it well with about half an ounce of pearl ashes, or of any
 “ fixed alkaline salt, and about a quarter of an ounce of
 “ charcoal dust : and having put them into a crucible, give
 “ them a strong heat. The lead will by this means be re-
 “ duced to its metallic state : and being weighed, will
 “ shew, by what it may fall short of the weight of an
 “ ounce, the proportion of the adulteration ; about a tenth
 “ part being allowed for the corroding acid which formed
 “ part of the white lead.”

CALCINED or BURNT HARTSHORN.

“ Take horn, or bones, and burn them in any common
 “ fire till they become a coal, or are calcined to some de-
 “ gree of whiteness. Then, having freed them carefully
 “ from any coal or filth, reduce them to a gross powder ;
 “ and put them upon a vessel made in form of a common
 “ earthen dish, of ground crucibles and Stourbridge clay,
 “ and well dried ; and procure this to be placed in a to-
 “ baccopipe-maker's or potter's furnace, during the time
 “ they keep their pipes or pots in the fire. The earth of
 “ the horn or bones being thus thoroughly calcined, it must
 “ be very well levigated with water ; and it will be yet
 “ further improved by being carefully washed over.”

This is a pure white, nor will change by either air or time: for the nicest purposes it is much used in water painting, and will not turn black in the manner flake white and white lead sometimes will. It is therefore preferred by the ~~more~~ experienced painters.

PEARL WHITE,

Is prepared by drying or calcining oyster shells at a fire, and taking that part of the powder that is of a perfect whiteness, levigating it well on a stone, and washing it over. It is serviceable in miniature painting.

TROY WHITE, or SPANISH WHITE,

May be used in water colours, from the following preparation:

“ Take a pound of chalk, and soak it well in water.
 “ Then wash over all the fine part; and having poured off
 “ the first water, add another quantity, in which two
 “ ounces of allum is dissolved. Let them stand for a day or
 “ two, stirring the chalk once in six or eight hours. Wash
 “ then the chalk again over, till it be rendered perfectly
 “ fine; and pour off as much of the water as can be separated
 “ from the chalk by that means, taking off the remainder
 “ of the dissolved allum, by several renewed quantities
 “ of fresh water. After the last water is poured off, put
 “ the chalk into one of the cullender filters, with a linen
 “ cloth over the paper; and when the moisture has
 “ been sufficiently drained off from it, lay it out in lumps
 “ to dry on a proper board.”

EGG SHELL WHITE,

Is made of the clear shell when the inner skin is peeled off, levigated to powder of a proper fineness, and washed over. It is used by some in water colours, and preferred to flake white.

CLASS VIII. Of BLACK COLOURS.

LAMP BLACK.

There is no other preparation than procuring it good, from burning oil in a confined place, and collecting the foot. It mixes well either with oil or water, and is esteemed as the principal black in all nicer kinds of painting.

IVORY BLACK.

“ Take plates, chips, or shavings of ivory ; and soak
“ them in hot linseed oil ; or, if filings are to be more easily
“ procured, they may be used moistened with the hot oil.
“ Put them into a vessel which will bear the fire ; covering
“ them with a sort of lid made of clay and sand ; which
“ should be dried, and the cracks repaired before the vessel
“ be put into the fire. Procure this vessel to be placed in a
“ tobacco-pipe-maker's or potter's furnace, or any other
“ such fire ; and let it remain there during one of their
“ heats. When it shall be taken out, the ivory will be
“ burnt properly ; and must be afterwards thoroughly well
“ levigated on the stone with water ; or it should, indeed,
“ to have it perfectly good, be also washed over.”

It is not so much used as lamp black, owing perhaps, to its drying slowly in oil, or to the frequent adulterations with charcoal dust, which renders it of a blue cast ; otherwise it is, if genuinely prepared from the ivory, a full clear black, and extremely serviceable.

INDIAN INK.

The true Indian ink is imported from China, and is of a consistence, when dissolved with water, extremely well adapted to the pencil. It is much used in miniature paint-

ing, and drawings of small kinds. There is a sort frequently sold for it made as follows :

“ Take of isinglass six ounces ; reduce it to a size, by
 “ dissolving it over the fire in double its weight of water.
 “ Take then of Spanish liquorice one ounce : and dissolve
 “ it also in double its weight of water ; and grind up with
 “ it an ounce of ivory black, prepared as above directed in
 “ p. 67. Add this mixture to the size while hot ; and stir
 “ the whole together till all the ingredients be thoroughly
 “ incorporated. Then evaporate away the water in a bal-
 “ neo mariæ, and cast the remaining composition into lead-
 “ ed moulds greased ; or make it up in any other form.”

The preceding are the chief of the substances there will be occasion to mention in drawing and painting ; but crayon and enamel colours will be treated of in their places.

THOSE persons who are accustomed to paint in oils, generally purchase their colours ready prepared in bladders ; a compleat set of which, with a palette, and requisites for painting, may be procured at the colour-shops.

Compleat sets of water-colours are also sold in boxes, with pencils, &c. for miniature painting, drawing, &c. The price, from eight shillings to three guineas.

As the oil colours prepared in bladders, if they are kept long, become useless ; and as those who are not professed artists seldom paint so much as to use them without great waste, it became a desideratum that some method should be found to render them more durable :—this Mr. Blackman has accomplished ; and at the same time has made them so portable, that they can be used with equal ease with the common water-colour cakes. We give the method of preparing them from Vol. XII. of the Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce.

Method of preparing BLACKMAN'S OIL-COLOUR
CAKES.

Take of the clearest gum mastick, reduced to fine powder, four ounces; of spirit of turpentine, one pint; mix them together in a bottle, stirring them frequently till the mastick is dissolved: if it is wanted in haste, some heat may be applied, but the solution is best when made cold. Let the colours to be made use of, be the best that can be procured, taking care, that by washing, &c. they are brought to the greatest degree of fineness possible. When the colours are dry, grind them on a hard close stone (porphyry is the best) in spirit of turpentine, adding a small quantity of the mastick varnish; let the colours so ground become again dry; then prepare the composition for forming them into cakes, in the following manner: Procure some of the purest and whitest spermaceti you can obtain; melt it over a gentle fire, in a clean earthen vessel; when fluid, add to it one third of its weight of pure poppy oil, and stir the whole well together; these things being in readiness, place the stone on which your colours were ground on a frame or support; and, by means of a charcoal fire under it, make the stone warm; next grind your colour fine with a muller; then, adding a sufficient quantity of the mixture of poppy oil and spermaceti, work the whole together with the muller to a proper consistence; take then a piece of a fit size for the cake you intend to make; roll it into a ball, put it into a mould, press it, and it will be complete.

When these cakes are to be used, they must be rubbed down in poppy or other oil, or in a mixture of spirit of turpentine and oil, as may best suit the convenience or intention of the artist.

Of PAINTING.

PAINTING is the art of representing to the eyes, by means of figures and colours, every object in nature that is discernable by the sight, and of expressing the various emotions of the mind. By an admirable effort of human genius, it offers to our vision every thing which is most valuable in the universe; its empire extends over every age and country: it presents to us the heroic deeds of ancient times, as well as those with which we are more conversant, and distant objects equally with those we daily see. In this respect it may be considered as a supplement to Nature, which gives us only a view of present objects.

The painter, who is distinguished for noble and profound conceptions; who conveys to the spectators the sentiments with which he is himself inspired; who animates them with his genius, and makes a lasting impression on their minds; this Artist is a poet, and worthy to share in the glories of Homer; but if he seek only to please, or astonish by the illusion of colours, he must rest contented with the secondary merit of flattering the eye with a variety of tints, or making an industrious assemblage of a multiplicity of objects.

The poet or the painter who excel in their professions, deserve all the respect due to genius; they are of the number of those men whom nature, sparing of her best gifts, grants but occasionally to the inhabitants of the earth. If they are sublime, they elevate the human race; if they are agreeable only, they excite those sweet sensations necessary to our happiness.

Of the SCHOOLS.

A School in the fine arts denominates a class of artists who have learned their art from a certain master, either by receiving his instructions, or studying his works. All the painters which Europe has produced since the renovation of the arts, are classed under the following schools:—The school of Florence, of Rome, of Venice, the Lombard, French, German, Flemish, Dutch, and English schools.

The school of Florence is remarkable for greatness, for attitudes seemingly in motion; for a certain dark severity; for an expression of strength, by which grace is perhaps excluded; and for a character of design approaching to the gigantic. It cannot be denied that the productions of this school, although overcharged, possess an ideal majesty which elevates human nature above mortality. The Tuscan artists, satisfied with commanding admiration, seem to have considered the art of pleasing as beneath their notice.

Cimabue, a noble Florentine, born in the year 1240, was the first, who, after the destruction of the Roman empire, practised the art of painting, which he learned from some Greek workmen who were employed by the Tuscan government. His pictures were, as may be imagined, in an ordinary stile; but they received the applause of his countrymen. So little practised was he in his art, that in his pictures, to prevent the possibility of a mistake in the judgment of the spectator respecting the subject, inscriptions were added, with sentences coming out of the mouths of the persons represented in them. To Cimabue succeeded Giotto, his disciple, who, when a shepherd's boy, was found by him drawing the figure of a sheep upon a stone: he soon became more celebrated than his master, and is

accounted one of the founders of the Florentine school. From this time the number of artists increased so rapidly, that, in 1350, they established a society under the protection of St. Luke.

Towards the commencement of the fifteenth century, the works of the Florentines possessed something of grandeur, life, and expression; and Masaccio is mentioned as the first, who gave force and relief to his pictures; but Michael Angelo, and Leonardo de Vinci were the glory of the school of Florence; the former superior in grandeur, in boldness of conception, and knowledge of design; the latter in all the amiable parts of the art. Leonardo, possessed of a fine imagination, and full of sensibility, devoted himself in painting to express the affections of the soul; and, if in this sublime branch of the art he was afterwards surpassed by Raphael, he had at least the glory, not only of surpassing all the painters who went before him, but of pursuing a path which none of them had attempted. Michael Angelo, less formed to experience sweet affections than violent passions, sought in nature what the strength of man might accomplish, not that which constitutes beauty. Better acquainted with anatomy than any other artist, he seems too eager to display his knowledge of it, and to have forgotten that the muscles are less visible in children, females, and young men, than in confirmed and vigorous manhood. "You never perceive, (says Mengs) a muscle at rest; and although he knew admirably well how to place them, their action is very frequently inconsistent with their situation." He never (says Sir Joshua Reynolds) attempted the lesser elegances and graces of the art; and if any man had a right to look down upon the lower accomplishments as beneath his attention, it was certainly Michael Angelo.

The Roman school has exceeded every other in beauty of form, grandeur, style, and just expression: this is to be attributed to the superior advantages they enjoyed, in having access to those precious remains of ancient art, which Rome, in its prosperity, drew from declining Greece; or which were executed in its own bosom by Grecian artists.

This school was altogether devoted to the principal parts of the art, to those which require genius and vast conceptions, and was no farther occupied with colours than was necessary to establish a difference between painting and sculpture; or rather between painting varied with colours, and *claro obscuro*.

At the head of this school is placed Raphael Sanzio, born at Urbino, in 1483.

In the early part of his life he had accustomed himself to copy nature with great exactness, but without being solicitous about the choice, or perhaps ignorant that any choice was necessary. When he saw the works of Leonardo da Vinci, and Michael Angelo, they gave to his genius a new direction; he perceived that there was something more in the art of painting than a simple imitation of truth; but the works of those masters were not sufficient to enable him to make the best choice; and he continued in uncertainty till he saw at Rome the works of the ancients; then he perceived, that in imitating them, he had only to follow the natural impulse of his genius.

His design is admirable—he excelled in representing the character of philosophers, apostles, and other figures of that kind. The Greeks were superior to him in ideal figures, but if he did not succeed in embellishing nature in the same high degree, he saw, at least, and imitated her in whatever was expressive and beautiful. The Greeks (says Mengs), failed with majesty between earth and heaven; Raphael walked with propriety on the earth.

Composition is in general (says the same author), of two kinds: Raphael's is the expressive kind; the other theatrical or picturesque, which consists of an agreeable disposition of the figures. Lanfranc was the inventor of the last, and after him Pietro de. Cortona. The preference is given to Raphael, because reason presides over all his works, or at least the greatest part of them. He never allowed himself in common ideas, nor ever suffered his necessary figures to turn the attention from the principal object of the piece. The excellency of Raphael (says Sir Joshua Reynolds) lay in the propriety, beauty, and majesty of his characters; his judicious contrivance of composition, correctness of drawing, purity of taste, and the skilful accommodation of other men's conceptions to his own purpose.

The school of Venice is the child of nature. The Venetian painters, not having under their eyes, like the Romans, the remains of antiquity, were destitute of the means of forming a just idea of the beauty of forms, and of expression. They copied without choice the forms of nature, but were chiefly delighted with the beauties which presented themselves in the mixture and variety of colours. Colouring was their chief object; and they endeavoured by the agreement and opposition of colours, and by the contrast of light and shade, to produce a vigorous effect, to demand and fix the attention. In this they succeeded.

Dominico, who was the second Italian artist who painted in oil, had educated, before he quitted Venice, Giacomo Bellino, who had two sons, Gentile and Giovanni, both of whom were painters; the latter contributed much to the progress of his art in painting constantly in oil and after nature. Giorgione and Titian, his scholars, are considered as the founders of the Venetian school.

Giorgione distinguished himself by a better taste in designing than his master; but he chiefly surpassed him in colouring. He died in his 32d year.

Tiziano Vecelli, better known by the name of Titian, was instructed in the school of Bellino, to copy nature in the most servile manner; but when he had seen the works of Giorgione, he began to study the ideal in colouring. The truth of history is not to be expected in his paintings, or in those of the artists of the same school. He paid little attention to the consistence of scene, to the costume, to expression adapted to the subject; or, finally, to the accommodation of parts which characterise the works of those who have studied the ancients.

The artists of the Florentine and Roman schools painted most commonly in water-colours, or in fresco; and, instead of nature, they finished their work from their first sketches. Titian painted in oil, and finished from the objects in nature; and this practice, joined to his exquisite talents, gave the greatest truth to his colours. His being a portrait painter was also of advantage to him as a colourist. In this department he was accustomed to the colours of nature in carnations and draperies.

He was a landscape painter; and here he also took the colours from nature.

Titian has, in general, little expression in his pictures; and he sometimes introduces figures which augment the coldness of the piece; for if it be true that heads, even in historical painting, ought to be studied from nature, it is true also that individual nature should not be presented, but one general and ideal. The painter fails in the effect which he ought to produce, if, when he represents Achilles, Hector and Caesar, his personages are familiar to our observation.

The distinguishing characteristics of the Lombard school are grace; an agreeable taste for design, without great correction; a mellowness of pencil; and a beautiful mixture of colours.

Antonio Allegri, called Corregio, was the father and greatest ornament of this school: he began by imitating nature alone; but as he was chiefly delighted with the graceful, he was careful to purify his design:—he made his figures elegant and large: and varied his outlines by frequent undulations; but he was not always pure and correct.

Corregio painted in oil, a kind of painting susceptible of the greatest delicacy and sweetness; and as his character led him to cultivate the agreeable, he gave a pleasing captivating tone to all his pictures. He sought transparent colours to represent shades conformable to nature, and adopted a manner of glazing which actually rendered his shadows more obscure. It is chiefly in this that he deserves to be imitated; for his lights are too clear, and somewhat heavy; and his fleshy parts are not sufficiently transparent. Harmony and grace are connected together; and on this account Corregio is excellent also in harmony. As the delicacy of his taste suffered him not to employ strong oppositions, he naturally became a great master in this part, which chiefly consists of easy gradations from one extreme to another. A delicate taste in colours, a perfect knowledge of the clear obscure, the art of uniting light to light, and shade to shade, together with that of detaching objects from the ground; inimitable, grave, and perfect harmony; were the qualities which distinguished Corregio from all painters, and placed him near the head of his profession.

The Carracci, Lewis, Augustin, and Hannibal, formed what is called the second Lombard school, which is frequently distinguished by the name of the school of Bologna.

Lewis was the master of the other two; he had studied the works of Titian and Paolo Veronese, of Andrea del Sarto, of Corregio, and of Julio Romano; but he chiefly endeavoured to imitate the manner of Corregio. Hannibal fluctuated between Corregio and Titian. Augustin, their rival in painting, had his mind cultivated by learning, and devoted part of his time to poetry, music, and other amply exercises.

These three painters often employed their talents upon the same work; and their united labours seemed to be animated with the same spirit.

They established an academy at Bologna, called *L'Accademia degli Disiderosi*; but it was afterwards known by the name of the Academy of the Carracci. In this school was taught the art of constructing models, perspective, and anatomy; lessons were given on the beautiful proportions of nature, on the best manner of using colours, and on the principles of light and shade. The academy separated on Hannibal's going to Rome to adorn the gallery of the cardinal Farnese.

The works of the Carracci are often, from the resemblance of their manner, confounded together; nevertheless, each of them has a decided character, distinct from the other two. Lewis had less fire, but more grace and grandeur: Augustin had more spirit in his conception, and more pleasantness in his execution. Hannibal is characterized by boldness, by a design more profound, by an expression more lucky, and by an execution more solid.

Lodovico Carracci (says Sir Joshua Reynolds), appears to me to approach nearest to perfection; his unaffected breadth of light and shadow, the simplicity of colouring, which, holding its proper rank, does not draw aside the least part of the attention from the subject; and the solemn effect of

that twilight which seems diffused over his pictures, appears to me to correspond with grave and dignified subjects, better than the more artificial brilliancy of sunshine which enlighens the pictures of Titian.

Hannibal is esteemed by the best judges as a model for beauty and design. Those who blame him for becoming less a colourist at Rome than he was at Bologna, ought to recollect that it is his performances at Rome which have chiefly secured his reputation. Severe critics have maintained, that his design is too little veiled in the figures; that he excels only in male beauty, and that in imitating ancient statues, he excites some resemblance, but without arriving at that sublimity of ideas and of style which characterise the ancients.

The success of Hannibal, and the reputation which he acquired, have been pernicious to the art. His successors, deluded by these considerations, have made him the object of their imitation, without ascending to the sources from which he derived his knowledge, and which they never could equal. The result has been, that instead of becoming equal to Hannibal, they have often copied his imperfections.

The French school has varied so much under different masters, that it is difficult to characterise it. Some of its artists have been formed on the Florentine and Lombard manner; others, on the Roman; others, on the Venetian; and a few have distinguished themselves by a manner which may be called their own. In speaking in general terms of this school, it appears to have no peculiar character; and it can only be distinguished by its aptitude to imitate easily any impression; and it may be added, speaking still in general terms, that it unites in a moderate degree the different parts of the art, without excelling in any one of them.

It is equally difficult to determine the progress of painting in France. Miniature painting, and painting on glass, were early cultivated in that country; and in these two kinds, the Italians had often recourse to French artists.

Confin, a painter on glass, and portrait painter, was the first who established any kind of reputation in France. He was correct, but possessed very little elegance of design. Painting, for some time encouraged by Francis the First, fell into a state of languor, from which it was not recovered till the reign of Louis XIII. Jacques Blanchard, formed in the Venetian school, and called the French Titian, flourished about this period; but as he left no pupils to perpetuate his manner, he must be regarded as a single good artist, and not as a founder of the French school.

In the same manner Poussin, whom they call the Raphael of France, educated no pupils, and formed no school. His stile and manner of painting, are described by Sir Joshua Reynolds as simple, careful, pure, and correct. No works of any modern have so much the air of antique painting as those of Poussin. His best performances have a certain dryness of manner, which seems perfectly correspondent to that ancient simplicity which distinguish his stile. In the latter part of his life he changed from this manner into one much softer and richer, where there is a greater union between the figures and the ground. His favorite subjects were ancient fables; and no painter was ever better qualified to paint such subjects, as he was eminently skilled in the knowledge of the ceremonies, customs, and habits of the ancients; and well acquainted with the different characters which those who invented them gave their allegorical figures.

Poussin, more admired than imitated, had no manner of influence in forming the French school. Simon Vouet had this honour, because his pupils, in the happy age of the arts,

in France, conferred on it the greatest splendour. Vouet was a man of distinguished abilities; but the school which he erected would have had no continuance, if his scholars had pursued his manner of painting. He had a kind of grandeur and facility; but his design was false with regard to colours, and without any idea of expression. He had the merit of destroying the insipid taste which reigned in France, and pointing the way to a better.

If Vouet laid the foundation of the French school, Le Brun finished the edifice. He had a noble conception, and a fruitful imagination; on no occasion was he inferior to the vast compositions he undertook. Few painters have united a greater number of essential qualities and accessories of the art:—he drew well, but his design was far from being so elegant as that of Raphael, or so pure as that of Domenichino; and it was less lively than that of Hannibal Carracci, whom he had taken as a model. In drapery he followed the Roman school; but in this part he was not equal to the painter of Urbino. He had studied the expression of the affections of the soul; but after observing the general characters, and establishing the principal traits of expression, he thought he had reached the whole extent of this subject which is so infinitely extended. He was delighted with great compositions; and he gave them life, animation, and variety; but he wanted the vigour and inspiration of Raphael. His compositions are founded on philosophical principles; but those of Raphael are created. Le Brun thought well; Raphael, Poussin, and Le Sueur thought most profoundly. Le Brun had elevation, but he was not elevated, like Raphael, to the sublime.

In colouring, Le Brun did not follow the painters of the Venetian school. The sweet attractions, and strong and solid colours of the schools of Rome and Lombardy, seem rather to have been the object of his imitation; and from

them also he learned an easy, agreeable, and bold management of the pencil.

Enfich le Sueur was the cotemporary and rival of le Brun; and no painter approached nearer to Raphael in the art of drapery, or in disposing the folds in the most artful and the noblest manner. His design was in general more slender than that of Raphael, but like his it was formed on the model of the ancients. Like Raphael he represented with art and precision the affections of the soul; like him he varied the air of the head, according to the condition, the age and the character of his personages; and, like him, he made the different parts of every figure contribute to the general effect. His intention in composing was to express his subject, not to make shining contrasts or beautiful groups of figures, not to astonish and bewitch the spectator by the deceitful pomp of a theatrical scene, or the splendour of the great machine. His tones are delicate, his tints harmonious, and his colours, though not so attractive as those of the schools of Venice and Flanders, are yet engaging. They steal peaceably on the soul, and fix it, without distraction on the parts of the art, superior to that of colouring.

If le Sueur had lived longer, or if like le Brun he had been employed under a court, fond of the arts and of learning, to execute the great works of the age, the French school would have adopted a different and a better manner. The noble beauty of his heads, the simple majesty of his draperies, the lightness of his design, the propriety of his expression and attitudes, and the simplicity of his general disposition would have formed the character of this school. The deceitful pomp of theatrical decoration would have been more lately introduced, or perhaps would never have appeared, and Paris might have been the counter-part to Rome.

But as le Brun, by an accidental concurrence of favourable circumstances, was the fashionable painter, to be employed or rewarded, it was necessary to imitate his manner; and as his imitators possessed not his genius, his faults became not only current but more deformed.

The French school not long ago changed its principles; and, if they follow the road which they have marked out for themselves, they have the chance of becoming the most rigid observers of the laws imposed on the Greek artists.

The Count de Caylus, pupil of Buchardon, who by his rank and fortune had the means of encouraging the imitators of the ancients, and of the masters of the 15th century, first formed the design of restoring a pure taste to the art of painting. He was seconded by the talents of M. Vien, an artist who had only occasion to have his lessons and his example laid before him.

In this manner commenced a revolution, so much the more wonderful, as it was scarcely ever known that any nation substituted a system of simple and rigid excellence in place of a false and glittering taste. The history of all nations on the contrary, discovers a gradual progress from a rude beginning to perfection, and afterwards to an irremediable decay. The French have the prospect of stopping short in this ordinary course. They have begun in a manner which promises success, and the best consequences may be expected from the study of those master pieces of ancient art with which the capital of the French Republic is ornamented, and which, to the honour of the government, are open to the inspection of every one. It is almost needless to mention that these invaluable works are the most capital productions of art, which were formerly at Florence, Rome, Turin, Naples and the cities in the Austrian Netherlands.

In Germany there can hardly be said to be a school, as it is a continuation of single artists, who derived their manner from different sources of originality and imitation. There were some German painters of eminence, when the art, emerging from its barbarous state, first began to be cultivated in Europe. As they were totally unacquainted with the ancients, and had scarcely access to the works of their contemporaries in Italy, they copied nature alone, with the exception of somewhat of that stiffness which forms the gothic manner. But this is by no means the case with their successors, part of whom were educated in Flanders, and part in Italy. For if Mengs* or Deitrich, were comprehended in this school, there would be nothing peculiar to its manner discovered in their works. It is therefore necessary to confine our observations to the more ancient German painters in whom the gothic stile is conspicuous.

Albert Durer was the first German who corrected the bad taste of his countrymen. He excelled in engraving as well as painting. His genius was fertile, his compositions varied, his thoughts ingenious, and his colours brilliant. His works, though numerous, were finished with great exactness; but as he owed every thing to his genius, and as works of inferior merit were by the false taste of the times preferred to his, it was impossible for him altogether to avoid

* Antonio Raphael Mengs was born at Aufsig in Bohemia. His first patron was Augustus 3d King of Poland, and his last and most generous was Charles 3d King of Spain. His grand work was the Apotheosis of St. Eusebius at Rome, and his most beautiful picture, that of the nativity at Madrid. There was a great rivalry existing between Reynolds and Mengs, who possessed little original genius, and was a scrupulous if not a servile copyist. He was coldly correct and the greater plagiary. In the chamber of painters at Florence are the portraits of Mengs and Reynolds by themselves, strongly characterised by the dignified but fullen air of the one, and the universal intelligence and liberality of the other.

the faults of his predecessors. He is blamed for stiffness, and aridity in his outlines, for little taste or grandeur in his expression, for ignorance of the costume, of aerial perspective, and of gradation of colours; but he had studied lineal perspective, architecture, and fortification.

John Holbein, nearly cotemporary with Albert Durer, painted in oil and water-colours. He excelled chiefly in history, and in portrait painting. His colours are fresh and brilliant, and his works highly finished; but in his historical subjects, his draperies are not in so good a taste as those of Albert Durer.

The Flemish school is recommended to the lovers of the art by the discovery, or at least the first practice of oil painting. It has been generally attributed to John Van Eyck, who was accustomed to varnish his distemper pictures with a composition of oils, which was pleasing, on account of the lustre it gave them. In the course of his practice he came to mix his colours with oil, instead of water, which he found rendered them brilliant without the trouble of varnishing. From this and subsequent experiments, arose the art of painting in oils, of which wonderful discovery Van Mandes gives a very particular account; but the truth of it is now very much questioned; and it is even proved that this method of painting was discovered long before the time of John Van Eyck. It is admitted that John and his brother Eubert, were the first who brought it into general practice, by shewing the excellence of which it was susceptible; their own paintings having acquired, all over Europe, great reputation for the softness and delicacy of their colours. The attention of the Italian painters was soon excited; and Antonio de Massina performed a journey into Flanders for the express purpose of acquiring the confidence of John Van Eyck, and of discovering the secret.

John of Bruges was the founder of painting as a profession in Flanders. Peter Paul Rubens was the founder of the art. This extraordinary person produced an immense number of works. He excelled equally in historical, portrait, and landscape painting; in fruits, flowers, and in animals. He invented, and executed with the greatest facility. The works of Rubens were destitute of that soft inspiration, productive of sweet and pleasant effects so conspicuous in the works of Raphael; but he possessed that sprightliness of genius and strength of mind, which are ever ready to burst forth in wonderful and astonishing effects. His figures appear to be the exact counterpart of his conceptions, and their creation nothing more than a simple act of the will. His chief merit consists in colouring; though in this branch of the art he has not equalled Titian. He is the first among painters eminent for pomp and majesty; the first among those who speak to the eye; and the power of the art is often by him carried almost to enchantment.

Rubens (says Sir Joshua Reynolds) is a remarkable instance of the same mind, being seen in all the various parts of the art. The whole is so much of a piece, that one can scarce be brought to believe but that if any one of them had been more correct and perfect, his works would not be so compleat as they appear. If we should allow a greater purity and correctness of drawing, his want of simplicity in composition, colouring, and drapery, would appear more gross.

The Flemish school, of which Rubens is the greatest master, is remarkable for great brilliancy of colours, and the magic of the *claro obscuro*. To these may be joined a profound design, which is yet not founded on the most beautiful forms; a composition possessed of grandeur, a certain air of nobleness in the figures, strong and natural expressions; in short, a kind of national beauty, which is

neither copied from the ancients, nor from the Roman or Lombard schools; but which deserves to please, and is capable of pleasing.

To speak in general terms, and without regarding a great number of exceptions, the Dutch school carries none of the above qualities to great perfection, except that of colouring. Far from excelling in the beauty of heads and forms, they seem to delight in the exact imitation of the lowest and most ignoble. Their subjects are derived from the tavern, the smith's shop, and from the vulgar amusements of the rudest peasants. The expressions are sufficiently marked; but it is the expression of passions which debase instead of ennobling human nature.

It must be acknowledged, at the same time, that the Dutch painters have succeeded in several branches of the art. If they have chosen low objects of imitation, they have represented them with great exactness; and truth must always please. If they have not succeeded in the most difficult parts of the *claro obscuro*, they, at least, excel in the most striking, such as is in light confined in a narrow space, night illuminated by the moon, or by torches, and the light of a smith's forge. The Dutch understand the gradations of colours. They have no rivals in landscape painting, considered as the faithful representation of a particular scene; but they are far from equalling Titian, Poussin, Claude Lorrain,* &c. who have carried to the greatest perfection the ideal landscape; and whose pictures, instead of being the topographical representation of certain places, are the combined result of every thing beautiful in their imagination or in nature. The Dutch distinguish

* In so great estimation are some of the landscapes by this master, that two pictures, known by the name of the *Altieri Claudes*, (from their having been long in the *Altieri* palace at Rome) were lately purchased by Mr. Beckford, for the almost incredible sum of 7000 guineas.

themselves by their perspective, by their clouds, sea scenes, animals, fruits, flowers, and insects; and they excel in miniature painting: in short, every thing which requires a faithful imitation, colour, and a nice pencil, is well executed by the Dutch painters.

Holland has also produced history painters, as Octavius Van Beem, and Vander Hilft, the rival of Vandyke; but it is not in the works of these artists that we find the character of the Dutch school.

Neither is the origin of their style to be derived from the works of Lucas of Leyden; though from the time he flourished, viz. about the end of the fifteenth century, he may be considered as the patriarch of the Dutch school. Lucas painted in oil, in water-colours, and on glass; and the kinds of his painting were history, landscape, and portrait.

If miniature painting be considered as a character of the Dutch school, Cornelius Polembourg may be regarded as the father of it. He possessed the colour, delicacy of touch, and disposition of the *claro obscuro*, which chiefly distinguish this school; and if any thing is to be added, it is want of correctness in his design.

But, if the choice of low figures is its chief characteristic, this is to be found in the greatest perfection in the works of the celebrated Rembrandt Vanryn; and it is the more offensive in this artist, as his compositions frequently required an opposite choice of figures. As his father was a miller, near Leyden, his education must altogether have depended on the exertion of great talents, and the study of nature. He studied the grotesque figure of a Dutch peasant, or the servant of an inn, with as much application as the greatest masters of Italy would have studied the Apollo of Belvidere, or the Venus de Medicis. This was not the manner of elevating himself to the noble conceptions of

Raphael; but it was acquiring the imitation of truth in vulgar painting.

Rembrandt (says Mr. Descamps) may be compared to the great artists for colour, delicacy of touch, and *claro oscuro*. He delighted in great oppositions of light and shade; and he seems to be chiefly attentive to this branch of the art. His workshop was occasionally made dark, and he received the light by a hole, which fell as he chose to direct it on, the place which he desired to be enlightened. His painting is a kind of magic: no artist knew better the effects of different colours mingled together, nor could better distinguish those which did not agree from those which did. He placed every tone in its situation with so much exactness and harmony, that he needed not to mix them, and so destroy what may be called the flower and freshness of the colours.

Such is the power of genius, that Rembrandt, with all his faults, and they are enormous, is placed among the greatest artists by Mr. Descamps, who had attentively examined his works, and was himself an artist.

John de Laer, a miniature painter, and who made choice of his subjects from common life, deserves a distinguished place in the Dutch school. He painted hunting-scenes, the attacks of robbers, public festivals, landscapes, and sea views. He had a correct design, and employed vigorous and lively colouring.

Van-Ostade, although born at Lubeck, Gerrard Dow, Metz, Miris, Wouvermans, Berghem, and the celebrated painter of flowers Van Huysum, belong to the Dutch school.

The greater part of the schools of which we have treated have no longer any existence. Italy alone had four schools, and there only remain at present a very few Italian

artists known to foreigners. The school of Rubens is in vain sought for in Flanders. If the Dutch school still exists, it is not known beyond the precincts of Holland. Mengs, a German artist, has rendered himself famous in our days; but it was in Italy that he chiefly improved his talents, and exercised his art. M. Dietrich, another German, has made himself known to strangers: but two solitary artists do not form a school.

THE English school has been formed in our own times. It is connected with the Royal Academy in London, instituted in 1766: but although as a school it did not exist before that time, yet ever since the revival of the arts, and the consequent encouragement given to them by the sovereigns of Europe, England has possessed portrait painters of ability; and perhaps it has been owing only to the remarkable partiality of the nation for this branch of the art, that the more noble one of history painting has been neglected.

Hans Holbein is ranked by Du Piles among the German painters; yet he painted his most celebrated works in England. He was the first painter of eminence encouraged by Henry the Eighth, who, excited by the fame which his cotemporaries Francis I. and Charles V. had gained as patrons of the arts, employed him, and invited Titian to England; but merely as a portrait painter—whether the reward offered was not thought adequate to his merit, or for some other cause, perhaps the knowledge that his talents for historical design would be depreciated; he firmly rejected the overture. The public works of Holbein, in England, are four only, as enumerated by Mr. Walpole, which are rather groups of portraits than history.

Nothing could be more unfavourable to female beauty than the dress of those times: Holbein's men are therefore much more characteristic than his ladies; even his Anna Bulleynne is deficient in loveliness, as he portrayed her. In his likenesses of Anne, of Cleves, he is said to have sacrificed truth to flattery; yet the original, which is in the possession of Mr. Barret, of Lee, in Kent, is below mediocrity. There are, in his Majesty's collection, a series of portraits of persons of quality in the reign of Henry the Eighth, sketched upon paper, with crayons, probably taken at a single sitting. They have lately been engraved by Bartolozzi, with all the strength and spirit of the originals.

Holbein was as celebrated in miniature as in oil colours. He made a great number of designs for engravers, sculptors, and jewellers. He died at his residence at Whitehall, in those lodgings which were afterwards the paper-offices.

The fame of Isaac Oliver, who flourished about the latter end of the reign of Elizabeth, as a miniature painter, is well known:—he received some instructions from Frederico Zuccherò, who was in England at that time, where, among other portraits, he painted that of the unfortunate Mary, Queen of Scots. Oliver drew well, and made some admirable copies from the Italian masters. Greatly as Isaac was celebrated, he was afterwards exceeded by his son Peter, who drew portraits of King James the First, Prince Henry, Prince Charles, and most of the court.

About this period, Cornelius Janson, a skilful portrait painter, came to England from Amsterdam, and painted the king and many of the nobility; but his merits being eclipsed by Vandyke, of whom he was jealous, and the civil war breaking out, he fled from England. Cornelius Janson was remarkable for high finishing in his draperies;

many of which are black, which seems to add roundness, relief, and spirit, to his figures and carnations. He is said to have used ultra marine in the black colours, as well as in the carnations, to which may be attributed their lustre even at this day. The Duke of Beaufort has a capital portrait of Janson by himself; but one of his best performances is the Rushout family, at Northwick, in Worcester-shire.

Daniel Mytens was a popular painter in the reign of James, and Charles I.—He had studied under Rubens, and was for some time principal painter to Charles, but was deprived of his place when Vandyke arrived in England. Charles, however, continued his pension during life.

Vandyke had his first instructions from Vaubalen, of Antwerp; but he soon found in Rubens a master every way more suited to direct his genius, and to mature that consummate taste which he very early showed marks of possessing. Under the instructions of Rubens, he acquired such skill in his art, that the portrait of his master's wife, which he painted whilst he was yet his disciple, is esteemed one of the best pictures in the Low Countries. He painted for his master two admirable pieces, one representing Christ seized in the garden, and the other the crowning him with thorns. When he left Rubens, he travelled into Italy; and on his return, having established his reputation as one of the first painters of the age, he was invited to England, where he was knighted by Charles I. and married one of the handsomest ladies of the court, the daughter of Lord Ruthven, Earl of Gowry. Towards the latter end of his life he went to France, in hopes of being employed in the great gallery of the Louvre; but not succeeding, he returned to England, and proposed to the king to make cartoons for the banquetting-house at Whitehall; but his demand of £.30,000 being judged

unreasonable, whilst the king was treating with him for a less sum, the gout, and other distempers, put an end to his life.

Dobson had merited from Charles I. the title of the English Tintoret, before his premature death, in 1646, at the age of only thirty-six years. He was the father of the English school of portrait painting; and though sometimes unequal, had much the manner of his master Vandyke. He resided much at Oxford, and left there the portraits of himself and wife, and of Sir Tradescant and his friend Zythepia the Quaker, in the staircase of the Ashmolean Museum. Dobson sometimes painted history. His decollation of St. John, at Wilton, and the astronomer and his family at Blenheim, are amongst those which are most known and admired.

Lely was in the former part of his life a landscape painter, but was induced to practice portrait painting, perhaps from the reputation and emolument which its professors obtained in England. Lely was chiefly celebrated for painting females; and it is sometimes objected to him, that his faces have too great a similarity of expression. The languishing air, the drowsy sweetness peculiar to himself, and,

“The sleepy eye that spoke the melting soul,”
is found in nearly all the pictures of females by this painter.

His crayon drawings are admirable. He drew the portrait of Charles I. when a prisoner at Hampton-Court. Charles II. knighted him, and made him his principal painter.

Kneller was the fashionable artist in the reigns of James II. and William:—among an infinity of portraits, there are some which bear the marks of excellence. Dr. Wallis, the mathematician, and Lord Crew, both for colouring and expression, are in a great style. The latter was admired

by Sir Joshua Reynolds for the air of nobility it possesses. Kneller is said to have drawn ten crowned heads, viz. four kings of England, and three queens; the Czar of Muscovy, the Emperor Charles, and Louis XIV. Notwithstanding the negligence which is manifest in most of his works, which arose from the desire of gain, his genius is very apparent. In his life-time he received the praise of his contemporaries; but the connoisseurs of the present age by no means allow that the praises of Pope were merited; speaking of Kneller he says—

“ Whose art was nature, and whose pictures thought.”

But how few of them deserve the compliment!

Thornhill painted several great works: his fresco paintings in the dome of St. Paul's, and the painted hall at Greenwich, are too well known to need describing. His copies of the cartoons of Raphael, which were purchased in 1800, for 450 guineas, have been presented to the Royal Academy by the Duke of Bedford. Richardson was a portrait painter of eminence: to his Treatise on Painting, we are indebted for the greatest ornament to the art; Sir Joshua Reynolds fixed the destination of his mind on the profession, occasioned by the accidental reading of that work. Pope praised Jervais, but without discernment. Those beauties which were to “bloom in his colours for a thousand years,” are now faded and unnoticed. Hudson was the best pupil of Richardson. The merit of Sir Joshua Reynolds, as a portrait painter, cannot be attributed to Hudson's instructions, since his manner seems entirely his own. Sir Joshua was born at Plimpton, in Devonshire, in the year 1723: his relations still preserve some frontispieces to the lives of Plutarch, as specimens of his early predilection for his art, and the promise he gave of becoming eminent in it. He became pupil to Hudson about 1743; who, amongst

other advice he gave him, recommended him to copy Guercino's drawings, which he did, with such skill, that many of them are preserved in the cabinets of collectors, as the original of that master. About the year 1750, he went to Rome to prosecute his studies, where he remained nearly two years, and employed himself rather in making studies from, than copying the works of the great painters: he amused himself with painting caricatures, particularly one of all the English then at Rome, in the different attitudes of Raphael's celebrated school of Athens. On his return he resided in Newport-street, but shortly after removed to Leicester-fields, where he continued till the time of his death.

An ingenious critic thus delineates Sir Joshua's professional character: "Sir Joshua Reynolds was, most assuredly, the best portrait painter that this age has produced: he possessed something original in his manner, which distinguished him from those painters who preceded him. His colouring was excellent; and his distribution of light and shadow so generally judicious and varied, that it most clearly shewed that it was not a mere trick of practice, but the result of principle. In history painting, his abilities were very respectable; and his invention and judgment were sufficient to have enabled him to have made a very distinguished figure in that very arduous branch of his profession, if the exclusive taste of his country for portraits had not discouraged him from cultivating a talent so very unproductive and neglected. His drawing, though incorrect, had always something of grandeur in it."

To his own pictures might well be applied what he used to say respecting those of Rubens: "They resemble," said he, "a well-chosen nosegay, in which, though the colours are splendid and vivid, they are never glaring or

oppressive to the eye." Sir Joshua was a great experimentalist with respect to the composition of his colours: at first he used preparations from vegetables, which he relinquished for minerals: he is known to have purchased pictures by Titian, or his scholars, and to have scraped off the several layers of colouring in order to ascertain it, and discover his secret.

The English school of painting must acknowledge Sir Joshua Reynolds as its great founder, under Royal auspices, in the establishment of the Academy. The pure precepts which he laid down in his annual orations, were exemplified in his own works: his most favourite paintings are,—

1. Garrick between Tragedy and Comedy.
2. The Ugolino in prison, in which he has imitated Michael Angelo in his "terribil via," as it is called by *Angostino Caracci*, in his sonnet on painting. It is Sir Joshua's triumph in the art.
3. The Nativity.
4. The Infant Hercules.
5. The Death of Cardinal Beaufort, in which are united the local colouring of Titian, with the *chiaroscuro* of Rembrandt.
6. Mrs. Siddons.
7. Mrs. Billington.
8. Robin Goodfellow.
9. Cimon and Iphigene.
10. Holy Family, which displays a novel and beautiful manner of treating that very frequent subject.

To speak generally of the English school, their colouring is less glaring than that of the Flemish or Venetian masters. Their talents are more admirable in portrait than history, particularly in those of females. Examine (says a French writer) a picture of a French woman, painted by an artist of that nation, and you will generally find, in place of expression, a forced grin, in which the eyes and forehead do not partake, and which indicates no affection of the soul. Examine the picture of an English woman done by one of their painters, and you observe an elegant and simple expression,

which makes you at once acquainted with the person represented.

Perhaps it might be difficult to assign to the English school, as exhibited in the Royal Academy, any perfect discrimination; as each painter, either implicitly follows his own genius, or attaches himself to that particular manner of the foreign schools which approaches nearest to his own ideas of excellence: but there are other exhibitions in which the best painters of the age have exerted a successful competition. Alderman Boydell's Shakespeare Gallery; Macklin's Gallery of Subjects, taken from the English poets; Boyer's Gallery of those illustrative of English History; and Fuseli's, from Milton, all by his own pencil, are very honourable testimonies of the spirit of private individuals in the cause of the arts.

Mr. Fuseli's boundless imagination has attempted, with surprising effect, to embody several metaphysical ideas which occur in the Paradise Lost. He has gained a free and uncontroled admission into the richest regions of fancy; but appears not to be solicitous about how few of his spectators can partially follow him there, or how many are totally excluded. The excellence of the present president of the Royal Academy (Mr. West), in historical and scriptural subjects, is universally allowed. The institution of the Order of the Garter is his grand work, both for composition, correctness, and finishing. His Death of the Stag; the Battles of La Hogue and the Boyne; and his Death of General Wolfe, are all in an excellent style of composition: the latter is esteemed by an eminent critic, a perfect model of historical composition; as the pictures by Barry, late professor of painting in the Royal Academy, (in the rooms of the society for the Encouragement of the Arts), are of the poetic style.

In the course of the last twenty years, some of the most able artists this country ever produced, have flourished and died. The great landscape painters of Italy have scarcely exceeded the Smiths of Chichester, Gainsborough, and Wilson, in truth and nature, and the accuracy of their native scenery. It would be injustice not to mention Wilson's pictures of Niobe, Phaeton, and Cicero at his Villa; which last rivals even Claude himself.

Mortimer, who died prematurely, in the freedom of his pencil, and the savage air of his banditti, his favourite subject, approached nearly to the boldest efforts of Salvator Rosa.

We rarely have met with an artist who was not admirer of some particular school, or attached to some favourite manner. The difficulties they find in the practice of their art tie them down to the mechanic, whilst self-love and vanity lead them into an admiration of those strokes of the pencil, which come nearest to their own.

Of living artists we decline speaking, with the exception of those whose eminence, as men of genius, has placed them beyond competition. In the works of Northcote, Opie and Lawrence*, we hail the continuance of an English school, and the happy application of those classical precepts which its founder, Sir Joshua Reynolds, delivered with so much dignity and effect. The principles of the art are exemplified in their works; and genius, so directed, will reach a degree of perfection of which the modern schools painting in Europe will aspire to with unsuccessful emulation.

* Lawrence's colossal figure of Satan and Beelzebub, from Milton, now the Duke of Norfolk's:—Mr. Kemble in Coriolanus, Sir Richard Worsley's, and as Rolla in Pizarro, have gained him unanimous admiration.

DESIGN.

IN painting, a good taste, and correctness of design, are so necessary, that a painter who wants them must not hope to attract esteem. Design being the foundation of all the other parts, its elegance and correctness are no less necessary in painting, than purity of language is in eloquence.

We are told by Pliny, that all the statues before the time of Dædalus, were represented stiff and motionless, with the feet closed, and arms hanging in right lines to their sides; or they had only the head finished; the body, arms, and legs not being expressed. These were the rude essays of design.

In the progress of the art, and in abler hands, motion was fashioned into grace, and life was heightened into character: beauty of form was no longer confined to mere imitation, which always falls short of the object imitated; to make the copy equal in its effect, it was necessary to give it an advantage over its model: the artists, therefore, observing that nature was sparing of her perfections, and that her efforts were limited to parts, availed themselves of her inequalities, and drawing those scattered beauties into a more happy and compleat union, rose from an imperfect imitation, to a perfect ideal beauty. We are informed, that the painters of Greece, pressed in crowds to design the bosom and breast of Thais; nor were the elegant proportions of Phryne less the object of their study: by this constant contemplation of the beautiful, they enriched their imagination, and confirmed their taste; from this fund they drew their systems of beauty; and though we should consider them but as imitators of the parts, we must allow them to have been the inventors in the compositions.

Should we doubt the justice of the preference given to invented beauty, over the real, we need only contemplate the fine proportions, and the style of drawing in the *Laocoon* and *Gladiator*, and mark the expressive energy of *Apollo*, and the elegant beauties of the *Venus de Medicis*. These are the utmost efforts of design; it can reach no farther than a full exertion of grace, beauty, and character.

The design of the ancients is distinguished by an union of proportions, a simplicity of contour, and excellence of character.

There is no one excellence of design from which we derive such immediate pleasure, as from gracefulness of action: if we observe the attitudes and movements of the Greek statues, we shall mark that careless decency, and unaffected grace, which ever attend the motions of men unconscious of observation.

Raphael has been wonderfully happy in imitating this simple elegance of the antique; the most courtly imagination cannot represent to itself an image of more winning grace than is to be seen in his *Santa Cecilia*. Indeed, an elegant simplicity is the characteristic of his design; we nowhere meet in him the affected contrasts of *Michael Angelo*, or the studied attitudes of *Guido*.

The design of Raphael was, in its beginning, dry, but correct; he enlarged it much on seeing the drawings of *Michael Angelo*: of too just an eye to give intirely into the excesses of his model, he struck out a middle style, which, however, was not so happily blended as quite to throw off the influence of the extremes: hence, in the great he is apt to swell into the charged; in the delicate to drop into the little: his design, notwithstanding, is beautiful; but never arrived to that perfection which we discover in the Greek statues.

He is excellent in the characters of philosophers, apostles, and the like ; but the figures of his women have not that elegance which is distinguished in the Venus di Medici, of the daughter of Niobe ; in these, his convex contours have a certain heaviness, by which, in seeking to avoid, he falls into a dryness still less pardonable. His proportions are esteemed excellent, yet not having formed his manner on the most beautiful antique, we do not see in him that elegant symmetry, that freedom in the joints which lend all their motion to the Laocoon and Gladiator ! instead of these, the figures of Michael Angelo were his models in the great style ; whence, having quitted the lines of nature, and not having substituted ideal beauty, he became too like his original, as may be seen in his Incendio di Borgo. Would we therefore place Raphael in his true point of view, we must observe him in the middle age ; in old men, or in the nervous nature : in his Madonna's, he knew how to choose, as likewise how to vary the most beautiful parts of nature ; but he knew not how to express a beauty superior to the natural.

Thus in his Galatea, where he has attempted a character of perfect beauty, he has fallen short of the beauty of his Madonna's : the cause of this seems to be, that he drew the former after his own ideas, which were imperfect : in the latter he copied beautiful nature, which was almost perfect : a second observation will confirm this opinion : of all the objects of painting, Angels call most for ideal beauty ; and those of Raphael are by no means distinguished in this particular.

One of the greatest excellences of design is grace. Oregio in this is inimitable. His constant aim was grace, and a happy effect of light and shade. A waving and varied contour was necessary to this end : hence he studi-

ously avoided right lines, and acute angles as too simple in their effects: Thus the habit and necessity of continually varying his outline, threw him into little errors in drawing, which spring not from an ignorance of this branch of his art, but from a predilection for another; and there are few who would with those inadvertences away, accompanied with the charms which gave occasion to them.

We may affirm of his design where it is not sacrificed to his more favorite aims, that it is often masterly, and always pleasing; a quality rarely to be met with in those servile painters, who think they have attained every perfection, if they keep within the rules of drawing (such painters, says Quintilian) while they think it sufficient to be free from faults, fall into that capital fault, the want of beauties.

We shall close this article with an account of the Apollo Belvidere, and the celebrated Groupe of Laocœon, so long the pride of Rome, but removed to Paris during its ravages by the French republicans, as described by the late Abbe Winckelman:

THE APOLLO BELVIDERE.

“Of all the productions of art, which have escaped the ravages of time, the Statue of Apollo Belvedere is unquestionably the most sublime. The artist founded this work upon imagination, and has only employed substance for the purpose of realizing his ideas. As much as the descriptions which Homer has given of Apollo are superior to those given of him by other Poets, in the same degree is this statue superior to any other statues of that deity. Its stature is above that of man, and its attitude breathes majesty. An eternal spring, such as reigns in the delightful fields of Elysium, clothes with youth the manly charms of his body,

and gives a brilliancy to the animated structure of his limbs.

“ Endeavour to penetrate into the regions of incorporeal beauty ; try to become the creator of a celestial nature, in order to elevate your soul to the contemplation of supernatural beauties ; for here there is nothing mortal : neither the veins nor sinews are too conspicuous ; a kind of celestial spirit animates the whole figure. The God has pursued Python, against whom he has, for the first time, bent his dreadful bow : in his rapid course he has overtaken him, and given him a mortal blow. In the height of his joy, his august features denote more than victory. Disdain is seated on his lips, and the indignation which he breathes distends his nostrils, and affects his eye-brows ; but still his forehead expresses serenity, and he is all full of sweetness as if he were surrounded by the Muses, eager to caress him.

Among all the figures of Jupiter which we possess, you will not see one in which the Father of the Gods displays so much of that majesty described by the poets, as does this statue of his son. The peculiar beauties of all the other gods are united in this figure, in the same manner as in the divine Pandora. The forehead is the forehead of Jupiter, impregnated with the Goddess of Wisdom ; his eye-brows, by their movement, declare their wishes ; his eyes in their celestial orbits, are the eyes of the Queen of the Goddesses ; and the mouth is that which inspired the beautiful Bacchus with voluptuousness. Like the tender branches of the vine, his fine hairs play about as if they were slightly ruffled by the breath of zephyrs ; they seemed perfumed with celestial essence, and negligently tied by the hands of the Graces.

“ On seeing this prodigy of art, I forgot the whole universe ; I placed myself in a more noble attitude to contem-

plate it with dignity. From admiration I passed to extacy; filled with respect, I felt my breast agitated like those who are inspired with the spirit of prophecy.

"I felt myself transported to Delos and the sacred woods of Lycia, places which Apollo honoured with his presence; for the beauty which was before my eyes appeared to be animated, as was formerly the beautiful statue produced by the chisel of Pygmalion. How can I describe you, oh, inimitable *chef d'œuvre*! Art itself must inspire me and guide my pen.

"The outlines which I have traced I lay at your feet; to those who cannot reach to the head of the deity they adore, place at his feet the garlands with which they wish to crown him."

THE GROUPE OF LAOCOON.

"Laocoon presents to us a picture of the deepest distress, under the representation of a man, contending with all his powers in his own defence, while his muscles and sinews are dilated and contracted by agony; you may still perceive the vigour of his mind expressed on his wrinkled forehead. His breast oppressed with restrained respiration, seems to contend against the pain with which it is agitated.

"The groans which he restrains, and his breath which he holds in, seem to exhaust the lower part of his body, and the loins, by being drawn in, seem to discover his very entrails. Nevertheless, his own sufferings seem to affect him less than those of his children, who look up to him as if imploring his succour. Compassion, like a dark vapour, overshadows his eyes. His physiognomy denotes complaint, his eyes are directed towards heaven, imploring assistance. His mouth bespeaks languor, and his lower lip is fallen. Agony, mixed with indignation at his unjust punishment, is displayed in all his features.

“The contest between pain and resistance is displayed with the greatest skill; for while the former draws up the eye-brows, the latter compresses the flesh over the eyes, and makes it descend over the upper eye-lids. The subject not allowing the artist to embellish nature, he has exerted himself to display contention and vigour. In those places where there is the greatest agony, there is also great beauty. The left side, on which the furious serpent makes its attack, seems to be in the greatest pain from its proximity to the heart. This part of the body may be called a prodigy of art. Laocoon wishes to raise his legs in order to escape. No part of the figure is in repose. The very flesh, by the skill of the artist, has the appearance of being benumbed.

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OF COLOURING.

COLOURING, though a subject greatly inferior to many others which the painter must study, is yet of sufficient importance to employ a considerable share of his attention; and to excel in it, he must be well acquainted with that part of optics which has the nature of light and colours for its object. Light, however simple and uncompounded it may appear, is nevertheless made up, as it were, of several distinct substances; and the number, and even dose, of these ingredients, has been happily discovered by the moderns. Every undivided ray, let it be ever so fine, is a little bundle of red, orange, yellow, green, azure, indigo, and violet rays, which, while combined, are not to be distinguished one from another, and form that kind of

light, called *white*; so that white is not a colour *per se*, as the learned De Vinci (so far, it seems, the precursor of Newton) expressly affirms, but an assemblage of colours. Now, these colours, which compose light, although immutable in themselves, and endued with various qualities, are continually, however, separating from each other in their reflection from, and passage through other substances, and thus become manifest to the eye. Grass, for example, reflects only green rays, or rather reflects green rays in greater number than it does those of any other colour; one kind of wine transmits red rays, and another yellowish rays; and from this kind of separation arises that variety of colours with which nature has diversified her various productions. Man, too, has contrived to separate the rays of light by making a portion of the sun's beams pass through a glass prism; for after passing through it, they appear divided into seven pure and primitive colours, placed in succession one by the other, like so many colours on a painter's pallet.

Now, though Titian, Corregio, and Vandyke, have been excellent colourists, without knowing any thing of these physical subtleties, that is no reason why others should neglect them. For it cannot but be of great service to a painter to be well acquainted with the nature of what he is to imitate, and of those colours with which he is to give life and perfection to his designs; not to speak of the pleasure there is in being able to account truly and solidly for the various effects and appearances of light. From a due tempering, for example, and graduating, of the tints in a picture; from making colours partake of each other, according to the reflection of light from one object to another; there arises, in some measure, that sublime harmony which may be considered as the true music of the eye; and this harmony has its foundation in the genuine prin-

ciples of optics. Now this could not happen in the system of those philosophers, who held, that colours did not originally exist in light, but were, on the contrary, nothing else than so many modifications which it underwent in being reflected from other substances; or in passing through them; thus subject to alterations without end, and every moment liable to perish. Were that the case; bodies could no more receive any hues one from another, nor this body partake of the colour of that, than Scarlet, for example; because it has the power of changing into red all the rays of the sun or sky which immediately fall upon it, has the power of changing into red all the other rays reflected to it from a blue or any other colour in its neighbourhood; whereas, allowing that colours are in their own nature immutable one into another, and that every body reflects, more or less, every sort of coloured rays, though those rays in the greatest number which are of the colour it exhibits, there must necessarily arise, in colours placed near one another, certain particular hues or temperaments of colour: nay, this influence of one colour upon another may be so far traced, that three or four bodies of different colours, and likewise the intenseness of the light falling upon each, being assigned, we may easily determine in what situations, and how much they would tinge each other. We may thus, too, by the same principle of optics, account for several other things practised by painters, in so much that a person, who has carefully observed natural effects with an eye directed by solid learning, shall be able to form general rules, where another can only distinguish particular cases.

But after all, the pictures of the best colourists are, it is universally allowed, the books in which a young painter must chiefly look for the rules of colouring; that is, of that branch of painting which contributes so much to express

the beauty of objects, and is so requisite to represent them as what they really are. Giorgio and Titian seem to have discovered circumstances in nature which others have entirely overlooked; and the last in particular has been happy enough to express them with a pencil as delicate as his eye was quick and piercing. In his works we behold that sweetness of colouring which is produced by union; that beauty which is consistent with truth; and all the insensible transmutations, all the soft transitions, in a word, all the pleasing modulations of tints and colours. When a young painter has, by close application, acquired from Titian, whom he can never sufficiently dwell upon, that art which, of all painters, he has best contrived to hide, he would do well to turn to Bassano and Paolo, on account of the beauty, boldness, and elegance of their touches. That richness, softness, and freshness of colouring, for which the Lombard school is so justly cried up, may likewise be of great service to him; nor will he reap less benefit by studying the principles and practice of the Flemish school, which, chiefly by means of her varnishes, has contrived to give a most enchanting lustre and transparency to her colours.

But whatever pictures a young painter may choose to study the art of colouring upon, he must take great care that they are well preserved. There are very few pieces which have not suffered more or less by the length, not to say the injuries, of time; and perhaps that precious *passiva*, which years alone can impart to paintings, is in some measure akin to that other kind which ages alone impart to medals; inasmuch as, by giving testimony to their antiquity, it renders them proportionably beautiful in the superstitious eyes of the learned. It must, indeed, be allowed, that if on the one hand, this *parina* bestows, as it really does, an extraordinary degree of harmony upon the colour

of a picture, and destroys, or at least greatly lessens, their original rawness, it, on the other hand, equally impairs the freshness and life of them. A piece seen many years after it has been painted, appears much as it would do, immediately after painting, behind a dull glass. It is no idle opinion, that Paolo Veronese, attentive above all things to the beauty of his colours, and what is called *Arepito*, left entirely to time the care of harmonizing them perfectly, and, (as we may say) mellowing them. But most of the old masters took that task upon themselves; and never exposed their works to the eyes of the public, until they had ripened and finished them with their own hands. And who can say whether the *Christ* of Moneta, or the *Nativity* of Bassano, have been more improved or injured (if we may so speak) by the touchings and re-touchings of time, in the course of more than two centuries? It is indeed impossible to be determined: but the studious pupil may make himself ample amends for any injuries which his originals may have received from the hands of time, by turning to truth, and to Nature which never grows old, but constantly retains its primitive flower of youth, and was itself the model of the models before him. As soon, therefore, as a young painter has laid a proper foundation for good colouring, by studying the best masters, he should turn all his thoughts to truth and nature. And it would perhaps be well worth while to have, in the academies of painting, models for colouring as well as designing; that as from the one the pupils learn to give their due proportion to the several members and muscles, they may learn from the other to make their tinctures rich and warm, and faithfully copy the different local hues which appear quite distinct in the different parts of a fine body. To illustrate still farther the use of such a model, let us suppose it placed in different lights; now, in that of the sun, now in that of the sky, and now again, in that of a

lamp or candle; one time placed in the shade, and another in a reflected light: hence the pupil may learn all the different effects of the complexion in different circumstances, whether the livid, the lucid, or transparent; and, above all, that variety of tints and half tints, occasioned in the colour of the skin by the *epidermis* having the bones immediately under it in some places, and in others a greater or less number of blood-vessels or quantity of fat. An artist who had long studied such a model, would run no risk of degrading the beauties of nature by any particularity of stile, or of giving into that preposterous fulness and floridness of colour which is at present so much the taste. He would not feed his figures with roses, as an ancient painter of Greece shrewdly expressed it, but with good beef: a difference which the learned eye of a modern writer could perceive between the colouring of Barocci and that of Titian. To practise in that manner, is, according to a great master, no better than inuring one's self to the commission of blunders. What statues are in design, nature is in colouring; the fountain head of that perfection to which every artist, ambitious to excel, should constantly aspire; and, accordingly, the Flemish painters, in consequence of their aiming solely to copy nature, are in colouring as excellent as they are wont to be awkward in designing. The best model for the tone of colours, and the degradation of shades, is furnished by means of the *camera obscura*.

We may form a general idea of the various effects of reflections from the following examples: If a blue be reflected on a yellow, the latter becomes greenish; if on a red, the red becomes purple; and so on through a variety of combinations. And as the white is of a nature to receive all the colours, and to be tinged with that of each reflection, the painter must be careful how his carnations may be affected by the several reflections.

OF COMPOSITION.

COMPOSITION, which may be considered as a branch of invention, consists in the proper stationing of what the inventive faculty has imagined, so as to express the subject in the most lively manner. The chief merit of composition may be said to consist in that disorder, which, wearing the appearance of mere chance, is, in fact, the most studied effect of art. A painter, therefore, is equally to avoid the dryness of those ancients who always planted their figures like so many couples in a procession, and the affectation of those moderns who jumble them together as if they were met merely to fight and squabble. In this branch Raphael was happy enough to choose the just medium, and attain perfection. The disposition of his figures is always exactly such as the subject requires. In the Battle of Constantine, they are confusedly clustered with as much art, as they are regularly marshalled in Christ's commitment of the keys to St. Peter, and constituting him prince of the apostles.

Let the inferior figures of a piece be placed as they will, the principal figure should strike the eye most, and stand out, as it were, from among the rest: this may be effected various ways, as by placing it on the foremost lines, or in some other conspicuous part of the piece; by exhibiting it, in a manner, by itself; by making the principal light fall upon it; by giving it the most resplendent drapery, or, indeed, by several of these methods; nay, by all of them together: for, being the hero of the picturesque fable, it is but just that it should draw the eye to itself, and lord it, as it were, over all the other objects.

According to Leon Batista Alberti, painters should follow the example of comic writers, who compose their fable of as few persons as possible : for, in fact, a crowded picture is apt to give as much pain to the spectator, as a crowded road to the traveller.

Some subjects, it must be granted, require a number; nay, a nation, as it were, of figures. On these occasions, it depends entirely on the skill of the painter to dispose of them in such a manner, that the principal ones may always make the principal appearance, and continue matters so, that the piece be not over-crowded, or want convenient rests and pauses : he must, in a word, take care that his piece be full, but not charged. In this respect, the Battles of Alexander, by Le Brun, are master-pieces which can never be sufficiently studied ; whereas nothing, on the other hand, can be more unhappy than the famous Basadino of Tintoret, which covers one entire side of the great council-chamber at Venice. It appears no better than a confused heap of figures, a swarm, a cloud, a chaos, which pains and fatigues the eye. What a pity it is that he did not dispose this subject after a model of his own, now in the gallery of Bevilacqua at Verona ! In this last, the several choirs of martyrs, virgins, bishops, and other saints, are judiciously thrown into so many clusters, parted here and there by a fine fleece of clouds, so as to exhibit the innumerable host of heaven, drawn up in a way that makes a most agreeable and glorious appearance. There goes a story, to our purpose, of a celebrated master, who, in a drawing of the Universal Deluge, the better to express the immensity of the waters that covered the earth, left a corner of his paper without figures. Being asked, if he did not intend to fill it up : No, said he ; do not you see that my leaving it empty is what precisely constitutes the picture ?

The reason for breaking a composition into several groups is, that the eye passing freely from one object to another, may the better comprehend the whole. But the painter is not to stop here; for these groups are, besides, to be so artfully put together, as to form rich clusters, give the whole composition a singular air of grandeur, and afford the spectator an opportunity of discerning the piece at a distance, and taking the whole in, as it were, at a single glance. These effects are greatly promoted by a due regard to the nature of colours, so as not to place together those which are apt to pain by their opposition, or distract by their variety. They should be so judiciously disposed as to temper and qualify each other.

A proper use of the chiaro-scuro is likewise of great service on this occasion. The groups are easily parted, and the whole picture acquires a grand effect, by introducing some strong falls of shade; and, above all, one principal beam of light. This method has been followed with great success by Rembrandt in a famous picture of his, representing the Virgin at the Foot of the Cross on Mount Calvary; the principal light darting upon her through a break of the clouds, while the rest of the figures about her stand more or less in the shade. Tintoret, too, acquired great reputation, as well by that briskness with which he enlivened his figures, as by his masterly manner of shading them; and Polidoro de Caravaggio, though he scarce painted any thing but basso-relievos, was particularly famous for introducing with great skill the effects of the chiaro-scuro, a thing first attempted by Mantegna in his Triumph of Julius Cæsar. It is by this means that his compositions appear so strikingly divided into different groups; and, among their other perfections, afford so much delight through the beautiful disposition that reigns in them.

In like manner, a painter, by the help of perspective, especially that called aerial, the opposition of local colours, and other contrivances which he may expect to hit upon by studying nature, and those who have best studied her before him, will be able not only to part his groups, but make them appear at different distances, so as to leave sufficient passages between them.

But the greatest caution is to be used in the pursuit of the methods here laid down; especially in the management of the *chiaro-scuro*, that the effects attributed to light and shade, and to their various concomitants, may not run counter to truth and experience. This is a capital point. For this purpose, a painter would do well to make, in little figures, as Tintoret and Poussin used to do, a model of the subject that he intends to represent, and then illuminate it by lamp or candle-light. By this means he may come to know with certainty, if the *chiaro-scuro*, which he has formed in his mind, does not clash with the reason of things. By varying the height and direction of his light, he may easily discover such accidental effects as are most likely to recommend his performance, and so establish a proper system for the illuminating it: nor will he afterwards find it a difficult matter to modify the quality of his shades, by softening or strengthening them, according to the situation of his scene, and the quality of the light falling upon it. If it should happen to be a candle or lamp-light scene, he would then have nothing to do but consider his model well, and faithfully copy it.

In the next place, to turn a groupe elegantly, the best pattern is that of a bunch of grapes, adopted by Titian; as, of the many grains that compose a bunch of grapes, some are struck directly by the light, and those opposite to them are in the shade, whilst the intermediate ones partake of both light and shade in a greater or less degree, so, according to

Titian, the figures of a groupe should be so disposed, that, by the action of the chiaro-scuro, several things may appear as it were but one thing; and, in fact, it is only from his having pursued this method, that we can account for the very grand effect of his pieces. This way, in which it is impossible to study him too much, is the only skill

The magnifics, who do not follow nature in the track of the masters just mentioned, are apt to commit many faults. The reason of their figures casting their shadows in this or that manner, seldom appears in the picture, what least does not appear sufficiently probable. They are, besides, wont to trespass all bounds in splashing their pieces with light, that is, enlivening those parts which we usually term the deads of a picture. This method, no doubt, has sometimes a very fine effect; but it is, however, to be used with no small discretion, as otherwise the whole loses that union, that pause, that majestic silence, as Caracci used to call it, which affords so much pleasure. The eye is not less hurt by many lights scattered here and there over a picture, than the ear is by the confused noise of different persons speaking all together in an assembly.

Guido Reni, who has imparted to his paintings that gaiety and splendour in which he lived, seems enlivened with a bright and open light; whereas Michael Angelo de Caravaggio, who was of a sullen and savage disposition, appears fonder of a gloomy and clouded sky; so that neither of them were qualified to handle indifferently all objects. The chiaro-scuro may likewise prove of great service to a painter in giving his composition a grand effect; but, nevertheless, the light he chooses must be adapted to the situation of the scene where the action is laid: nor would he be less faulty, who, in a grotto or cavern, where the light entered by a chink, should make his shades soft and tender, than he who should represent them strong and bold in an open sky light.

in. But this is by no means the only fault which mannerists are apt to be guilty of in historical pieces, and particularly in the disposition of their figures. To say nothing of their favourite groupe of a woman lying on the ground, with one child at her breast, and another playing about her, and the like, which they generally place on the first lines of their pieces; nor of those half-figures in the background peeping out from the hollows contrived for them: they make a common practice of mixing naked with clothed figures; old men with young; placing one figure with its face towards you, and another with its back; they contrast violent motions with languid attitudes, and seem to almost oppose in everything; whereas opposition rarely pleases; but when they arise naturally from the subject, like Antitheses in a discourse, they are not only admissible, but common.

As to shortened figures, too much affectation in using or avoiding them is equally blamable. The attitudes had better be composed than otherwise. It very seldom happens that there is any occasion for making them so impetuous as to be in danger of losing their equilibrium, a thing too much practised by some painters.

In regard to drapery, equal care should be taken to avoid that poverty which makes some masters look as if, through mere poverty, they grudged clothes to their figures; and that profusion which Albani imputed to Guido, saying, that he was rather a tailor than a painter. The ornaments of dress should be used with great sobriety; and it will not be amiss to remember what was once said to an ancient painter: "O pity you greatly; unable to make Helen handsome, you have taken care to make her fine."

Let the whole, in a word, and all the different parts of the composition, possess probability, grace, costume, and the particular character of what is to be represented. Let nothing look like uniformity of manner which does not

appear less in the composition than it does in colouring, drapery, and design; and is, as it were, that kind of accent, by which painters may be as readily distinguished as foreigners are, by pronouncing in the same manner all the different languages they happen to be acquainted with.

CRAYON PAINTING.

WHETHER the painter works with oil colours, water colours, or crayons, the grand object of his pursuit is still the same: a just imitation of nature. But each species has its peculiar rules and methods. Painting with crayons requires, in many respects, a treatment different from painting in oil colours; because all colours used dry are, in their nature, of a much warmer complexion than when wet with oils, or any other binding fluid. Let this be proved by matter of fact:—Mr. Cotes painted a portrait of Sir William Chambers, which is in Lord Besborough's collection. An ingenious foreigner had discovered a method of fixing crayon pictures, so that they would not rub or receive an injury if any accident happened to the glass. The Society for the encouragement of Arts had before offered a premium to any one who should discover so valuable a secret, for which premium he made application. Mr. Cotes being eminent in his profession, was desired to lend a picture for the trial, and give his judgment, which was made on this portrait of Sir William Chambers. The crayons he indeed so perfectly fixed as to resist any rub or brush without the least injury, which before would have entirely defaced or spoiled it: but

the picture, which before had a particularly warm, brilliant, and agreeable effect, in comparison became cold and purple; and though in one sense the attempt succeeded to the designed intention of fixing the colours, yet the binding quality of whatever fluid was made use of in the process, changed the complexion of the colours, rendering the cold tints too predominant. For this reason, in order to produce a rich picture, a much greater portion of what painters term cooling tints must be applied in crayon painting, than would be judicious to use in oils. Without any danger of a mistake, it is to be supposed, the not being acquainted with this observation is one great cause why so many oil painters have no better success when they attempt crayon painting. On the contrary, crayon painters, being so much used to these tints which are of a cold nature when used wet, are apt to introduce them too much when they paint with oils, which is seldom productive of a good effect.

Another observation I would make, which requires particular notice from the student who has been conversant with oil painting, prior to his attempts with crayons; oil painters begin their pictures much lighter and fainter than they intend to finish them, which presents the future colouring clear and brilliant, the light underneath greatly assisting the transparent glazing and scumbling colours, which, if they were laid over any part already too dark, would but increase its heavy effect. On the contrary, crayons being made of dry colours, are difficult to procure sufficiently dark, the crayon painter therefore will find an absolute necessity to begin his picture as dark and rich as possible, except in the strongest lights; for if once the grey and light tints become predominant, it will be next to impossible for him (in the deep shadows especially) to restore depth and brilliancy, having no opportunity of glazing or scumbling to give the effect, as the grey tints being mix-

tures with whiting underneath, will continually work up and render the attempt abortive.

I shall now endeavour to give the student some directions towards the attainment of excellence in this art.

The student must provide himself with some strong blue paper, the thicker the better, if the grain is not too coarse and knotty, though it is almost impossible to get any entirely free from knots. The knots should be levelled with a penknife or razor, otherwise they will prove exceedingly troublesome. After this is done, the paper must be pasted very smooth on a linen cloth, * previously strained on a deal frame, the size according to the artist's pleasure; on this the picture is to be executed; but it is most eligible not to paste the paper on till the whole subject is first sketched out. The method of doing this is very easy, by laying the paper with the dead colour on its face, upon a smooth board or table, when, by means of a brush, the back side of the paper must be covered with paste; the frame, with the strained cloth, must then be laid on the pasted side of the paper; after which turn the painted side uppermost, and lay a piece of clean paper upon it, to prevent wrinkling; this being done, it may be stroked gently over with the hand, by which means all the air between the cloth and the paper will be forced out.

When the paste is perfectly dry, the student may proceed with the painting. The advantages arising from pasting the paper in the frame, according to this method, after

* That side of the paper should be pasted which has the strokes from the wires most evident; that the painting may be on the smoothest side; otherwise the lines, which these wires have left in the paper will prove troublesome and look unpleasant.

† Some crayon pictures are painted on vellum; but the animal salts in the skin very often cause them to mildew. It must be confessed the vellum gives the picture a soft aspect; but its use cannot be recommended in our unfavourable climate. Others make use of small grounds; Le Tour, lately a painter

the picture is begun, are very great, as the crayons will adhere much better than any other way, which will enable the student to finish the picture with a firmer body of colour, and greater lustre. The late Mr. Cotes discovered this method by accident, and esteemed it a valuable acquisition; and, I remember, on a particular occasion, he removed a fine crayon picture of Rozalba's and placed it on another strained cloth, without the least injury, by soaking the canvas with a wet sponge, till the paste between the cloth and paper was sufficiently wet to admit of separation.

When painters want to make a very correct copy of a picture, they generally make use of a tiffany, or black gauze, strained tight on a frame, which they lay flat on the subject to be imitated, and with a piece of sketching chalk, trace all the outlines on the tiffany. They then lay the canvas to be painted on, flat upon the floor, placing the tiffany with the chalked lines upon it, and with an handkerchief brush the whole over: this presents the exact outlines of the picture on the canvas. The crayon painter may also make use of this method, when the subject of his imitation is in oils, but in copying a crayon picture, he must have recourse to the following method, on account of the glass.

The picture being placed upon the easel, let the outlines be drawn on the glass with a small camel's hair pencil dipped in lake, ground thin with oils, which must be done with great exactness; after this is accomplished, take a sheet of paper of the same size, and place it on the glass, stroking

of note in Paris, often used them with great success. The method to prepare them is to brush over the paper with gum water, which directly strew with small moderately fine, the superfluous part of which should be swept off, with a painter's brush, when the gum water is perfectly dry. On this the picture is to be painted; but we have paper now in England so prepared of so excellent a texture, as to render this preparation perhaps unnecessary.

over all the lines with the hand, by which means the colours will adhere to the paper, which must be pierced with pin holes pretty close to each other. The paper intended to be used for the painting must next be laid upon a table and the pierced paper placed upon it; then with some fine pounded charcoal, tied up in a piece of lawn, rub over the perforated strokes, which will give an exact outline. Great care must be taken not to brush this off till the whole is drawn over with sketching chalk, which is a composition made of whiting and tobacco-pipe clay, rolled like crayons, and pointed at each end.

When the student paints immediately from the life, it will be most prudent to make a correct drawing of the outlines on another paper, the size of the picture he is going to paint, which he may trace by the preceding method, because erroneous strokes of the sketching chalk (which are not to be avoided without great expertness) will prevent the crayons from adhering to the paper, owing to a certain greasy quality in the composition.

The student will find the sitting posture, with the box of crayons on his lap, the most convenient method for him to paint. The part of the picture he is immediately painting should be rather below his face, for, if it is placed too high, the arm will be fatigued. Let the windows of the room where he paints be darkened at least to the height of six feet from the ground; and the subject to be painted should be situated in such a manner, that the light may fall with every advantage on the face; avoiding too much shadow, which seldom has a good effect in portrait painting, especially if the face he paints has any degree of delicacy. Before he begins to paint, let him be attentive to his subject, and appropriate the action or attitude proper to the age of the subject: if a child, let it be childish; if a young lady, express more vivacity than in the majestic beauty of a middle

aged woman, who also should not be expressed with the same gravity as a person far advanced in years. . . . Let the embellishments of the picture, and introduction of birds, animals, &c. be regulated by the rules of propriety and consistency.

The features of the face being carefully drawn with chalk, let the student take a crayon of pure carmine, and carefully draw the nostril and edge of the nose, next the shadow; then, with the faintest carmine tint, lay in the strongest light upon the nose and forehead, which must be executed broad. He is then to proceed gradually with the second tint, and the succeeding ones, till he arrives at the shadows, which must be covered brilliant, enriched with much lake, carmine, a little broken, with brilliant green. This method will, at first, offensively strike the eye, from its crude appearance; but, in finishing, it will be a good foundation to produce a pleasing effect, colours being much more easily sullied when too bright, than when the first colouring is dull, to raise the picture into a brilliant state. The several pearly tints, discernable in fine complexions, must be imitated with blue, verditer and white, which answers to the ultramarine tints used in oils. But if the parts of the face where these tints appear are in shadow, the crayons composed of black and white must be substituted in their place.

Though all the face, when first coloured, should be laid in as brilliant as possible, yet each part should be kept in its proper tone, by which means the rotundity of the face will be preserved.

Let the student be careful when he begins the eyes, to draw them with a crayon inclined to the carmine tint, of whatever colour the iris are of; he must lay them in brilliant, and, at first, not loaded with colour, but executed lightly: no notice is to be taken of the pupil yet. The student must let the light of the eye incline very much to the blue cast, cautiously avoiding a staring, white appear-

ance, (which, when once introduced, is seldom overcome); preserving a broad shadow thrown on its upper part, by the eye-lash. A black and heavy tint is also to be applied in the eye-brow; it is therefore, best to execute them like a broad, glowing shadow at first, on which, in the finishing, the hairs of the brow are to be painted, by which method of proceeding, the former tints will show themselves through, and produce the most pleasing effect.

The student should begin the lips with pure carmine and lake, and in the shadow use some carmine and black; the strong vermilion tints should be laid on afterwards. He must beware of executing them with stiff, harsh lines, gently intermixing each with the neighbouring colours, making the shadow beneath broad, and enriched with brilliant crayons. He must form the corner of the mouth with carmine, brown ochre, and greens, variously intermixed. If the hair is dark, he should preserve much of the lake and deep carmine tints therein; this may be easily overpowered by the warmer hair tints, which, as observed in painting the eye-brows, will produce a richer effect when the picture is finished; on the contrary, if this method is unknown or neglected, a poverty of colouring will be discernable.

After the student has covered over, or, as artists term it, has dead-coloured the head, he is to sweeten the whole together by rubbing it over with his finger, beginning at the strongest light upon the forehead, passing his finger very lightly, and uniting it with the next tint, which he must continue till the whole is sweetened together, often wiping his finger on a towel to prevent the colours being soiled. He must be cautious not to smooth or sweeten his picture too often, because it will give rise to a thin and scanty effect, and have more the appearance of a drawing than a solid painting, as nothing but a body of rich colours can constitute a rich effect. To avoid this, (as the student finds it necessary to

sweeten with the fingers) he must continually replenish the picture with more crayon.

When the head is brought to some degree of forwardness, let the back ground be laid in, which must be treated in a different, covering it as thin as possible, and rubbing it into the paper with a leather stump. Near the face the paper should be almost free from colour, for this will do great service to the head, and, by its thinness, give both a soft and solid appearance. In the back ground also, crayons which have whiting in their composition should be used, but seldom or never without caution; but chiefly such as are the most brilliant and the least adulterated. The ground being painted thin near the face, will give the student an opportunity of painting the edges of the hair over in a light and free manner, when he gives the finishing touches.

The student having proceeded thus far, the face, hair, and back ground being entirely covered, he must carefully view the whole at some distance, remarking in what respect it is out of keeping, that is, what parts are too light, and what too dark, being particularly attentive to the white or chalky appearances, which must be subdued with lake and carmine. The above method being properly put into execution will produce the appearance of a painting principally composed of three colours, viz. carmine, black, and white, which is the best preparation a painter can make for producing a fine crayon picture.

The next step is to complete the back ground and the hair, as the dust, in painting these, will fall on the face, and would much injure it, if that was completed first. From thence proceed to the forehead, finishing downward till the whole picture is completed.

Back grounds may be of various colours; but it requires great taste and judgment to suit them properly to different complexions: in general, a strong coloured head should

have a weak and tender tinted ground, and, on the contrary, a delicate complexion should be opposed with strong and powerful tints; by which proper contrast between the figure and the back ground, the picture will receive great force, and strike the spectator much more than it could possibly do, was this circumstance of contrast not attended to.

Young painters often treat the back grounds of pictures as a matter of very little or no consequence, when it is most certain great part of the beauty and brilliancy of the picture, especially the face, depends upon the tints being well suited, the darks kept in their proper places, and the whole being perfectly in subordination to the face. Thus a simple back ground requires attention, but the difficulty is still greater when a variety of objects are introduced, such as hills, trees, buildings, &c. in these cases one rule must be strictly attended to; that each grand object be disposed so as to contrast each other; this is not meant merely respecting their forms, but their colour, their light, shade, &c. For instance, we will suppose the figure receiving the strongest light; behind the figure, and very near at hand, are the stems of some large trees; these must have shade thrown over them, either from a driving cloud or some other interposing circumstance; behind these stems of trees, and at a distance, are seen trees on a rising ground; these should receive the light as a contrast to the former; &c. If an architectural back ground be chosen, the same rule must be applied; suppose a building at a moderate distance is placed behind the figure receiving the light; a column, or some other object in shadow should intervene, to preserve proper decorum in the piece, or what will have the same effect, a shadow must be thrown over the lower part of the building, which will give equal satisfaction or repose to the eye. It must be remembered, the light must be always placed against

the dark, and the weak against the strong, in order to produce force and effect, and *vice versa*.

In painting over the forehead the last time, begin the highest light with the most faint vermillion tint, in the same place where the faint carmine was first laid, keeping it broad in the same manner. In the next shade, succeeding the lightest, the student must work in some light blue tints, composed of verditer and white, intermixing with them some of the deeper vermillion tints, sweetening them together with great caution, * insensibly melting them into one another, increasing the proportion of each colour as his judgment shall direct. Some brilliant yellows may also be used, but sparingly; and towards the roots of the hair, strong verditer tints, intermixed with greens, will be of singular service. Cooling crayons, composed of black and white, should succeed these, and melt into the hair. Beneath the eyes, the pleasing pearly tints are to be preserved, composed of verditer and white, and under the nose, and on the temples, the same may be used; beneath the lips tints of this kind also are proper, mixing them with the light greens and some vermillion.

The introduction of greens and blues into the face, in painting, has often given surprize to those who are unacquainted with the art, but there is reason sufficient for their introduction (though it may appear strange at first) in order to break and correct the other colours.

The carmine predominating in the dead colour, is, as has been observed, the best preparation for the succeeding tints; the crudeness of this preparation must be corrected by variously intermixing greens, blues, and yellows, which of these are to be used is to be determined by the degree

* This direction is for the finest complexions, but the student must vary his colouring according to his subject.

of carmine in the dead colour, and the complexion intended. The blue and yellow are of a nature diametrically opposite, and serve to correct the reds, and oppose one another; the greens being compounded of both these colours, is of peculiar use in many cases where the transition is not to be so violent.

The student, attentively considering nature, will discover a pleasing variety of colours on the surface, and discernible through a clear and transparent skin; this variety will be still increased by the effect of light and shade; he will perceive one part inclining to the vermilion red, another to the carmine or lake, one to the blue, this to the green, and that to the yellow, &c. In order to produce these different effects he will apply those colours to which the tints are most inclined; yet in crayon painting it is often best to compound the mixed colours upon the picture, such as blue and yellow instead of green; blue and carmine instead of purple; red and yellow instead of orange; in other circumstances the compounds already mixed should be used: but in this case there can be no absolute rule given, it must be left to the experience and discretion of the painter, though the student may be greatly assisted in the commencement of his studies, by an able master to direct and point out the best method to treat circumstances of this nature, as they occur in practice, which may at first appear obscure and mysterious, but will soon, to a good capacity, become demonstrably clear upon certain and sure principles; the circumstances that require different treatment are so various and so many, as to render it impossible here to descend to every particular.

In finishing the cheeks, let the pure lake clear them from any dust contracted from the other crayons; then, with the lake, may be intermixed the bright vermilion; and last of all (if the subject should require it) a few touches of the

orange coloured crayon, but with extreme caution; after this sweeten that part with the finger as little as possible, for fear of producing a heavy, disagreeable effect on the cheeks: as the beauty of a crayon picture consists in one colour shewing itself through, or rather between another; this the student cannot too often remark, it being the only method of imitating beautiful complexions.

The eye is the most difficult feature to execute in crayons, as every part must be expressed with the utmost nicety, to appear finished: at the same time that the painter must preserve its breadth and solidity, while he is particularizing the parts. To accomplish this, it will be a good general rule for the student to use his crayon, in sweetening, as much, and his finger as little as possible. When he wants a point to touch a small part with, he may break off a little of his crayon against the box, which will produce a corner fit to work with in the minutest parts. If the eye-lashes are dark, he must use some of the carmine and brown powder, and the crayon of carmine and black; and with these he may also touch the iris of the eye (if brown or black) making a broad shadow, caused by the eye-lash. Red tints of vermilion, carmine and lake, will execute the corners of the eye properly; but if the eye-lids are too red, they will have a disagreeable sore appearance. The pupil of the eye must be made of pure lamp-black; between this and the lower part of the iris, the light will catch very strong, but it must not be made too sudden, but be gently diffused round the pupil till it is lost in shade. When the eye-balls are sufficiently prepared, the shining speck must be made with a pure white crayon, which should be first broken to points and then laid on firm; but as it is possible they may be defective in neatness, they should be corrected with a pin, taking off the redundant parts, by which means they may be formed as neat as can be required.

The difficulty, with respect to the nose, is to preserve the lines properly determined, and at the same time so artfully blended into the cheek as to express its projection, and yet no real line to be perceptible upon a close examination; in some circumstances it should be quite blended with the cheek which appears behind it, and determined entirely with a slight touch of red chalk. The shadow caused by the nose is generally the darkest in the whole face, partaking of no reflection from its surrounding parts. Carmine and brown oker, carmine and black, and such brilliant crayons will compose it best.

The student having before prepared the lips with the strongest lake and carmine, &c. must, with these colours, make them compleatly correct; and, when finishing, introduce the strong vermillions, but with great caution, as they are extremely predominant. This, if properly touched, will give the lips an appearance equal, if not superior to those executed in oils, notwithstanding the seeming superiority the latter has, by means of glazing,* of which the former is entirely destitute.

When the student paints the neck, he should avoid expressing the muscles too strong in the stem, nor should the bones appear too evident on the chest, as both have an unpleasant effect, denoting a violent agitation of the body, a circumstance seldom necessary to express in portrait painting. The most necessary part to be expressed, and which should ever be observed (even in the most delicate subjects) is a strong marking just above the place where the collar bones unite, and if the head is much thrown over the shoulders, some notice should be taken of the large muscle that rises

* The method with which painters in oil express transparency in the lips is, by painting them first with light vermillion tints, and, when dry, touching them over with pure lake.

from behind the ear, and is inserted into the pit between the collar bones. All inferior muscles should be, in general, quite avoided. The student will find this caution necessary, as most subjects, especially thin persons, have the muscles of the neck much more evident than would be judicious to imitate. As few necks are too long, it may be necessary to give some addition to the stem, a fault on the other side being quite unpardonable, nothing being more ungraceful than a short neck. In colouring the neck, let the student preserve the stem of a pearly hue, and the light not so strong as on the chest. If any part of the breast appears, its transparency must also be expressed by pearly tints, but the upper part of the chest should be coloured with beautiful vermillions, delicately blended with the other.

Of the MATERIALS.

THE perfection of the crayons consists, in a great measure, in their softness, for it is impossible to execute a brilliant picture with them if they are otherwise, on which account great care should be observed in the preparing them, to prevent their being hard.—In all compositions, flake white, and white lead should be wholly rejected, because the lightest touch with either of these will unavoidably turn black.

The usual objection to crayon paintings is, that they are subject to change, but whenever this happens it is entirely owing to an injudicious use of the above-mentioned whites, which will stand only in oils. To obviate the bad effects

arising from the use of such crayons, let the student make use of common whiting prepared in the following manner:

Take a large vessel of water, put the whiting into it, and mix them well together; let this stand about half a minute, then pour off the top into another vessel, and throw the gritty sediment away; let what is prepared rest about a minute, and then pour it off as before, which will purify the whiting and render it free from all dirt and grittiness. When this is done, let the whiting settle, and then pour the water from it; after which, lay it on the chalk to dry, and keep it for use, either for white crayons, or the purpose of preparing tints with other colours, for with this, all other tints may be safely prepared.

The student must be provided with a large, flexible pallet-knife, a large stone and muller to levigate the colours, two or three large pieces of chalk to absorb the moisture from the colours after they are levigated, a piece of flat glass to prevent the moisture from being absorbed too much till the colours are rolled into form, and vessels for water, spirits, &c. as necessity and convenience shall direct.

REDS.

CARMINE *and* LAKE.

It is rather difficult to procure either good carmine or good lake. Good carmine is inclined to the vermillion tint, and should be an impalpable powder, and good lake to the carmine tint. The carmine crayons are prepared in the following manner:

As their texture is inclinable to hardness instead of grinding and rolling them, take a sufficient quantity of carmine, lay it upon the grinding-stone, mix it with a

levigating knife with spirits of wine, till it becomes smooth and even; yet the less friction produced by the knife the better. The chalk-stone being ready, lay the colour upon it to absorb the spirit, but be careful that it is laid on in a proper shape for painting.

The simple colour being prepared, the next step is to compose the different tints by a mixture with whiting; the proportion to be observed consisting of twenty gradations to one, which may be clearly understood by the following directions: Take some of the simple colour, and levigate it with spirits of wine, adding about one part of washed whiting to three parts of carmine, of which, when properly incorporated, make two parcels. The next gradation should be composed of equal quantities of carmine and whiting, of which four crayons may be made. The third composition should have one fourth carmine, and three fourths whiting; of this make six crayons, which will be a good proportion with the rest. The last tint should be made of whiting, very faintly tinged with carmine, of which make about eight crayons, which will complete the abovementioned proportion.

N. B. Though these tints made with whiting may be rolled, yet the pure carmine will not bear it, but must be left on the chalk-stone till perfectly dry.

LAKE

Is a colour very apt to be hard; to prevent which the student must observe the following particulars:

Take about half the quantity of lake intended for the crayons, and grind it very fine with spirits of wine; let it dry, and then pulverize it, which is easily done if the lake is good; then take the other half and grind it with spirits;

after which mix it with the pulverized lake, and lay it out directly in crayons on the chalk. The colour will not bear rolling. The simple colour being thus prepared, proceed with the compound crayons as directed before, and in the same degrees of gradation as the carmine tints.

VERMILLION, or NATIVE CINNABAR.

The best is inclined to the carmine tint. To prepare this colour, mix it on the stone with soft water, or spirits, after which it may be rolled into crayons.

BLUES.

PRUSSIAN BLUE

Is a colour very apt to bind, and is rendered soft with more difficulty than carmine and lake. The same method of preparation is to be followed with this as directed with respect to lake, only it is necessary to grind a larger quantity of the pure colour, as it is chiefly used for painting draperies.

BLUE VERDITER

Is a colour naturally gritty, and therefore it is necessary to wash it well. Its particles are so coarse as to require some binding matter to unite them, otherwise the crayons will never adhere together. To accomplish this, take a quantity sufficient to form two or three crayons, to which add a piece of flaked plaster of Paris about the size of a pea; mix these well together, and form the crayons upon the chalk. This blue is extremely brilliant, and will be of great use in heightening draperies, &c.

GREENS.

Brilliant greens are produced with great difficulty, which may be procured of those who make it their business to prepare them; yet the following compositions will be found useful: Take yellow oker, and after grinding it with spirits, mix it with the powder of Prussian blue; then temper it with a knife, and lay the crayons on the chalk without rolling them: besides this, use king's yellow, mixed with Prussian blue, brown oker, and Prussian blue.* The crayons made of these last may be rolled.

YELLOW.**KING'S YELLOW**

Is the most useful and the most brilliant, levigated with spirits of wine, and compose the different tints as before directed. Yellow oker, and Naples yellow, ground with spirits, will make useful crayons.

ORANGE

Is produced with king's yellow and vermillion, ground together with spirits, and the tints formed as in other cases; but no great quantity of them is required.

BROWNS.**CULLEN'S EARTH.**

Is a fine dark brown. After six or eight of the simple crayons are prepared, several rich compound tints may be made. Brown oker and Prussian blue mixed in different proportions will be useful.

produced from it, by a mixture with carmine in various degrees : black, carmine, and this colour, mixed together, make useful tints for painting hair ; several gradations may be produced from each of these by a mixture with whiting.

UMBER

May be treated in just the same manner, only it is necessary to levigate it with spirits of wine.

PURPLES.

Prussian blue ground with spirits, and mixed with pulverized lake, will produce a good purple. Carmine thus mixed with Prussian blue will produce a purple something different from the former. Various tints may be made from either of these compounds by a mixture with whiting.

BLACK.

LAMP-BLACK

Is the only full black that can be used with safety, as all others are subject to mildew.

Cinnabar mixed with carmine.—This is a composition of great use, and tints made from this with whiting will be found very serviceable.

Carmine and black is another good compound, of which five or six gradations should be made, some partaking more of the black, and others having the carmine most predominant, besides several tints by a mixture with whiting.

Cinnabar and black is also a very useful compound, from which several different tints should be made.

Prussian blue and black is another good compound, and will be found of singular service in painting draperies.

It is impossible to lay down rules for forming every tint necessary in composing a set of crayons; there being many accidental compositions entirely dependent on fancy and opinion. The student should make it a rule to save the leavings of his colours, for of these he may form various tints which will occasionally be useful.

Of ROLLING *the* CRAYONS *and* DISPOSING *them for* PAINTING.

THE different compositions of colours must be cut into a proper magnitude after they are prepared, in order to be rolled into pastils, for the convenience of using them. Each crayon should be formed in the left hand with the ball of the right, first formed cylindrically, and then tapered at each end. If the composition is too dry, dip the finger in water; if too wet the composition must be laid upon the chalk again to absorb more of the moisture. The crayons should be rolled as quick as possible; and when finished, must be laid upon the chalk again, to absorb all remaining moisture. After the gradation of tints from one colour is formed, the chalk and the grinding-stone should be well scraped and cleansed with water before it is used for another colour.

When the set of crayons is completed according to the rules prescribed, they should be arranged in classes for the convenience of painting with them. Some thin drawers, divided into a number of partitions, is the most convenient

method of disposing them properly. The crayons should be deposited according to the several gradations of light. The bottom of the partitions must be covered with bran as a bed for the colours, because it not only preserves them clean, but prevents their breaking.

The box made use of when the student paints, should be about a foot square, with nine partitions. In the upper corner, on the left hand, (supposing the box to be in the lap when he paints) let him place the black and grey crayons, (those being the most seldom used); in the second partition, the blues; in the third, the greens and browns; in the first partition on the left hand of the second row, the carmines, lakes, vermillions, and all deep reds; the yellows and orange in the middle; and the pearly tints next; and as these last are of a very delicate nature, they must be kept very clean, that the gradations of colour may be easily distinguished: in the lowest row, let the first partition contain a piece of fine linen rag to wipe the crayons with while they are using; the second, all the pure lake and vermillion tints; and the other partitions may contain those tints, which, from their complex nature, cannot be classed with any of the former.

ENCAUSTIC PAINTING.

THIS method of painting has been little practised in England. For the information of the curious we give the following directions, which will enable them to produce with ease a picture in this very curious manner.

The first method is described in a letter from Mr. Febroni, the inventor, published in Maty's Review for 1785.

Mr. Lewis, of Gottenburg, has lately executed a picture according to my manner: it is done upon wood prepared with wax; and is remarkable for the vivacity and splendour of its colours. (I believe I have already mentioned to you, in what this new manner consists: you melt, or rather dissolve, some good white wax in naphtha petrolei,* without colour, till such time as the mixture has acquired, by cooling, the appearance of an oil beginning to freeze. Mix your colours in this, and then keep them in small tin boxes; you dilute them more or less, with the same naphtha, according as they dry, or as you wish, to use them. This painting allows time enough to give all the finishing you desire; and if you wish to work in haste, you may dry as fast as you please by exposing it to the heat. When the picture is finished, it is of that fine tone which is preferable to any varnish; but if you choose a varnish only, warm the picture, and the naphtha will evaporate. When this is done, you must wait till the picture cools, when you must polish it by rubbing it over neatly with a cloth. If you wish to have it still brighter, you must melt white wax on the fire, without suffering it to boil; mix a little naphtha with this, and draw a layer of it over the picture already heated, by means of a brazier, which you hold under, if the picture is small, or before it if it is large: the colours at first appear spoiled, but you restore them to their first beauty, if, when the layer of wax is cooled, you polish it by rubbing with a cloth; it is then that the colours take the high tone of oil. If you fear the effect of fire for your picture, you are to make a soap of wax, which is to be done by boiling white wax in water, in which you have dissolved a twentieth part

* Naphtha petrolei is a bituminous kind of oil, issuing out of certain rocks in the territory of Modena. There are three sorts, more or less, pure and colourless.

of the weight of the wax of marine alkali, or *sel de soude*, very pure. Rub your picture with this soap; and when it is dry, polish it as before-mentioned: if you do not choose either of these methods, give your painting its usual varnish of sandarac and spirit of turpentine. This method has been found preferable to all those that have been tried, and superior to oil for the beauty of their colours. There are many fine colours which cannot be used in oil, which may be made use of with great success in this method.

As the naptha entirely evaporates, one may be assured that this is the true method of painting in wax. There is likewise much to hope for the duration of the pictures painted in this manner, as wax is much less liable to alteration than oil, and does not so easily part with its phlogiston.*

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The ANCIENT GRECIAN METHOD of PAINTING,

By EMMA JANE GREENLAND.*

TAKE an ounce of white wax, and the same weight of gum mastick in lachrymæ, that is, as it comes from the tree, which must be reduced to a coarse powder. Put the wax in a glazed earthen vessel, over a very slow fire, and when it is quite dissolved, strew in the mastick, a little at a time, stirring the wax continually, until the whole quantity

* A Gold Medal was, on this occasion, voted to Emma Jane Greenland, November 14, 1786, by the Society at London for the Encouragement of Arts, Manufactures, and Commerce.

of gum is perfectly melted and incorporated; then throw the paste into cold water, and when it is hard, take it out of the water, wipe it dry, and beat it in one of Mr. Wedgwood's mortars, observing to pound it at first in a linen cloth to absorb some drops of water that will remain in the paste, and would prevent the possibility of reducing it to a powder, which must be so fine as to pass through a thick gauze. It should be pounded in a cold place, and a little while at a time, as, after long beating, the friction will in a degree soften the wax and gum; and instead of their becoming a powder, they will return to a paste.

Make some strong gum arabick water, and when you paint, take a little of the powder, some colour, and mix them together with the gum-water. Light colours require but a small quantity of the powder, but more of it must be put in proportion to the body and darkness of the colours; and to black, there should be almost as much of the powder as colour.

Having mixed the colours, and no more than can be used before they grow dry, paint with fair water, as is practised in painting with water colours, a ground on the wood being first painted of some proper colour prepared in the same manner as is described for the picture; walnut-tree and oak are the sorts of wood commonly made use of in Italy for this purpose. The painting should be very highly finished, otherwise, when varnished, the tints will not appear united.

When the painting is quite dry, with rather a hard brush, passing it one way, varnish it with white wax, which is put into an earthen vessel, and kept melted over a very slow fire till the picture is varnished, taking great care the wax does not boil. Afterwards hold the picture before a fire, near enough to melt the wax, but not make it run; and when the varnish is entirely cold and hard, rub it gently

with a linen cloth. Should the varnish blister, warm the picture again very slowly, and the bubbles will subside.

When the picture is dirty, it need only be washed with cold water.



THE VENETIAN METHOD of COLOURING.

By TIMOTHY SHELDRAKE, Esq.*

THE method of Painting practised in the Venetian School:

“The cloth was primed with colours in distemper, of a brownish hue, such as would properly enter into the darkest parts of the picture. The most transparent colours are the properest. I believe umber was most generally used, broken with red, yellow, or blue, according to the tint intended to be produced, and diluted with chalk or whiting to the proper degree of strength. Upon the ground so prepared, the subject was correctly drawn with umber, pure, or mixed with lake, blue, or black; and, with the same colours, those shadows that were darker than the ground were then painted in.

The artist then painted the lights with *pure white*, in a solid body, where the light was brightest, or where the full effect of colour was to be produced; and, where the demi-tints were afterwards to be, scumbling it thinner by degrees, till it united with the shadows.

In this manner the chiaro-oscuro was finished as much as possible, and the local colour of every object in the picture

* The Greater Silver Pallot was voted to Mr. Sheldrake, for this Dissertation on Painting in Oil, in 1792, by the Society instituted at London, for the Encouragement of Arts, Manufactures and Commerce.

glazed over it. All the colours used in this part of the work were ground in oil, which was absorbed into the ground, the picture remaining flat, something like a picture in water-colours or crayons; it was then varnished, till saturated with varnish, and the full of every colour brought out: the picture was then complete.

Upon the most superficial view of this process, it will be evident that a picture painted by it is, as to all visible properties, a varnish picture; for the small quantity of oil that had been used, sunk into the ground, and never could rise again to be hurtful; while the varnish, being laid on after the colours, gave them all the brilliancy and durability they could derive from that vehicle, without being liable to the objections that are made to painting in varnish, supposing it to be used in the same manner as oil is in painting with oil. It is true that this mode of painting is itself liable to some objections; these I have endeavoured to obviate, and shall therefore mention hereafter. Here it may be observed, that, as any varnish may be used, it is to this circumstance we must attribute the different degrees of durability in pictures of the Venetian School. I have seen some that would resist the most powerful solvents, while others were destroyed by the weakest; though all possessed the apparent properties that distinguish the Venetian pictures from all others.

As I do not pretend to degrade painting to the rank of a mechanical art, that may be infallibly practised by a receipt, I shall be permitted to observe, that this was the general system of the Venetian school, which I have seen variously modified in the works of different artists of that, as well as of the Flemish, which is derived from it. It is susceptible of an almost infinite number of modifications, in proportion to the talents, the judgment of, and the objects to be painted by the artists who may adopt it. This being the case, it is

proved by experiment that effects similar to those of the Venetian pictures may be produced by this method; and that the system has a strong tendency to produce that brilliancy and harmony of colouring as is so much admired, with more certainty and facility than those qualities can be obtained by any other mode of painting.

I once asked Sir Joshua Reynolds, by what circumstances in the management of a picture he thought the harmony of colouring was to be produced? He replied, an unity of light and an unity of shadow should pervade the whole. He explained to me the difficulty of reducing the various colours of all the objects that may be included in a picture, and the various modifications of those colours to the simple, harmonious state he described, and illustrated what he had said by this simile. "A picture, to possess harmony of colouring, should look as if it was painted with one colour (suppose umber and white), and, when the chiaro-oscuro was complete, the colour of each object should be glazed over it."

This observation, from such authority, was impressed with peculiar force on my mind; and if I can retrace its operations on a subject which has so long engaged my attention, I should say Sir Joshua's observation was the clue that guided me through all my experiments; and, I hope, will enable me to prove, that the beautiful and simple practice which he suggested as a simile, was literally the practice of that school upon whose works his ideas of colouring were founded. At the same time I may observe, that the fact seems to have eluded his observation, or he would not have used it as a comparison to simplify his description of a practice which he thought both difficult and complex.

In the Newtonian doctrine of Light and Colours, it is believed that all colours are inherent in light, and are rendered visible by the action of various bodies, which reflect

particular rays, and absorb the rest. Without disputing the truth of this doctrine, it is to be observed, that a painter must consider the objects he represents as being analogous to the materials he uses to represent them; and, in this view of the subject, colour is to be considered as a property inherent in bodies, which is rendered visible by the contact of light, a colourless, or at least a monocoloured substance, and shadow the mere privation of light.

A picture may represent either a groupe of figures, or other objects, in a room, or any objects in the open air: whatever the situation may be, it represents certain objects in a given space, possessing individually their peculiar colours, and generally exposed to the operations of light. The quantity of light each can receive, must depend upon its form, and its position respecting that part whence the light comes; for, in proportion as other parts recede from the light, the shadow becomes visible: but shadow is nothing but privation of light, and privation of colour, in proportion as the light is diminished. Some attention to these circumstances will, perhaps, enable us to demonstrate the truth of Sir Joshua's position.

If a globe of one colour be exposed in a painter's room, properly darkened, that part which is nearest the light will partake of its colour; the next part will shew the true colour of the object; that which first recedes from the light will be a little obscured, the next a little more; and so on progressively, till that part which is farthest from the light will lose its colour, and appear equally dark with the shadiest part of the room. Now we know this globe is of one uniform colour; the variations we see in different parts of it are only deceptions, occasioned by the accession of light in some parts, and the privation of it in others.

What is true of this one object and its parts, would be equally true of any number of objects, whatever their colours or relative situations might be: if they were placed together in the same room, each would possess its own individual colour, each would partake of the general light, in proportion to its situation, and of the general darkness in proportion as it recedes from the light. All this may be easily conceived; but the difficulty, and, in the ordinary modes of painting a serious one it is, is to represent such objects with the appearance of truth, and preserve the harmony necessary to constitute a whole. The Venetian painters, however, by whatever means they obtained their knowledge, discovered a method so simple, that perhaps no other can produce such brilliant effects, and undoubtedly not with facility and certainty at all comparable with their's.

The artist will remark that, in describing the whole of the Venetian method of painting, I have said nothing of the manner of producing those demi-tints which conduce so much to the brilliancy of a picture, which are so difficult to execute, and in which he most frequently fails. Those tints are, in the ordinary modes of painting, produced by the mixture of black, grey, blue, or brown (according to the judgment of the artist), with the local colours of the objects. It is these tints which, from their being made with such colours, it is difficult to get clear, and which never are so clear in any other as in the Venetian, and in some of the Flemish pictures, which are painted upon analogous principles. The fact is, that those painters produced all such tints without the admixture of any colour to represent them, and by a method so like that by which they are produced in nature, that this circumstance alone ensures a degree of brightness to their colours, and of

harmony, to their shadows; that it is perhaps impossible to produce, in an equal degree, by any other mode of painting.

It is a singular fact, which I have not skill in physics to be able to account for, though by numerous experiments I have ascertained, beyond contradiction, that if upon any degree of brown, between the deepest and the lightest brown, yellow, we paint pure white, in gradations, from the solid body to the lightest tint that can be laid on, all the tints between the solid white and the ground will appear to the eye, intense in proportion to the depth of the ground, and the thinness of the white laid upon it. But in every case all the tints laid upon one ground will harmonize with each other, and form one connected chain (if I may use the expression), which will perfectly unite the highest light with the darkest shade.

If then we examine the component substances of a Venetian picture, we shall find the lighter parts consist only of white, to represent the light; and of the local colours of the objects it represents, the demi-tints are imitated by an appearance almost as deceptive as the similar appearances in nature: but in every other method of painting, these demi-tints are produced by mixing some dusky colour with the local colours and the light. The comparison of these methods will afford a demonstrative reason why the Venetian must be brighter than any other mode of painting.

Having shewn as near to a demonstration as the nature of the subject will perhaps admit, why those parts of a Venetian picture that are connected with light and colour are brighter than the corresponding parts of any other pictures, it remains to explain the cause of similarity or unity in the darker parts of the same pictures.

To one, I have observed, that the darker parts of a picture

It has been said, with much confidence, that as white represents light, so black is the representative of darkness. But though this may be true in physics, it certainly is not so in painting: for the painter's art is to represent objects as they appear, in point of colour, to be, not as they really are. Thus, if I know an object is perfectly black, and am to represent it as it appears to be at the distance of fifty feet, black from the pallet will not produce a good imitation of it, because the interposition of fifty feet of the atmosphere will cause it to appear of a colour different from what it really is; and *vice versa*, if we go into a cavern, a cellar, or a room, so darkened that the colour of no object can be distinctly seen, and if we there hold any solid black substance near to the eye, the difference will be visible at once; the black object will be immediately distinguished, by its solidity and colour, from the surrounding space, and such remote objects as may be obscurely visible through it. These objects actually possess their individual colours, and only appear indistinctly from the absence of light. The black object may appear solid, and of that colour, from its proximity to the eye; but the circumjacent ones will appear of a colour perfectly distinct from it, more or less transparent, in proportion to their distance from the eye, and shewing a portion of their individual colours, according to the quantity of ill-defined light that may be admitted. Thus we see (if I may venture to mention so notorious a truism), that shadows are nothing real; they only seem to exist in the absence of light, and give to objects an ill-defined appearance, distinct from, though in some instances mixed with, light and colours, in different degrees: but as the painter must represent this appearance by something real, he chooses the colours most analogous

viz. browns, and the most transparent of their class, to represent this transparent, but imperfectly defined appearance in nature.

It has been supposed that the Venetian painters had some peculiarly rich and transparent brown colour, which is seen to pervade all the works of that school; the effect of which no modern artist has been able to imitate, and which therefore is supposed to have been lost. Is it not very probable that a colour so common as to pervade the works of the worst as well as of the best artists of that school, should be so unaccountably lost; and, as the effect attributed to it may be easily produced by the mode of painting I have described, it is not unreasonable to conclude that this much-lamented colour has never existed.

It is well known that chalk, and other earths of the same kind, lose, when wetted, much of their whiteness, and become semi-transparent; it is equally certain, that if umber or other earths are mixed with chalk, and saturated with varnish after they are laid on the cloth, they, in like manner, become diaphanous, and are infinitely more brilliant than the same colours can be when mixed with white lead and oil. This seems, on good grounds, to have been the basis of the Venetian method of painting, and all its peculiar effects; at least, if I may draw any conclusion from the numerous experiments I have made. But if artists, whose talents will enable them to repeat those experiments to the best advantage, should be induced to do so, the fact will be determined in the most satisfactory manner.

I may now be permitted to say, it is difficult, if not impossible, to conceive a theory more simple, more beautiful, or more true, than that of Sir Joshua Reynolds. It is certainly impossible to form a practice more simple, or more

conformable to that theory, than the one I have described, as will be evident on recapitulating the particulars.

The artist, having determined what hue should pervade his picture, formed his ground with that colour prepared in distemper; upon this the subject was drawn, and the darker shades painted in with transparent colours, which sunk into the ground: with pure white he then painted in all the lights and demi-tints; and, lastly, glazed in the colours, each in its place. Upon applying the varnish, the darker shades were, as to body, incorporated with the ground; and thus, though different in colour, appeared thinner and more transparent than any colours could be when laid upon any ground: the full effect of every colour was brought out, and the picture was complete.

Whoever has been accustomed to paint, or to mark the progress of painting in the common way, and will reflect on the practice of the method I have described, by artists who had been brought up to it, must see that such artists would paint with a degree of facility, expedition, and certainty, as to effect, that could never be equalled in the ordinary way of painting in oil; besides, it will be evident that an artist would not only paint a picture himself with more facility; but, if he had occasion, could employ a number of subordinate artists upon large works, and put those works out of hand with more uniformity, as to merit and effect, than if he were to employ such assistants in similar works if they were to be painted in the common way.

I am sensible how little attention will, and perhaps ought to be paid to observations on painting, if made by those who are not professionally artists: for practical men acquire a kind of knowledge that can never be obtained in any

other way; but at the same time they contract prejudices that often prevent them from fully investigating any novelty in practice that may be offered to their notice. The speculative man, on the contrary, who investigates the properties of matter, unshackled by practical prejudices, and with ideas purely chemical or philosophical, will be more likely to ascertain all the facts relative to any theory that may become the object of enquiry. In this way, I hope, I have proceeded in this investigation. I have endeavoured to consider pictures as masses of matter, possessing the properties, but differing from each other in degree of brilliancy, transparency, and duration. I will, I thought, perhaps, here to take leave of this subject; but it may be expected that I should give an account of the manner in which the pictures were painted.

I have already mentioned that there are some difficulties in the method of painting I have described, as being that of the old artists; and which would form objections of considerable force to the practice of it by artists who are well acquainted with the usual modes of painting; these difficulties are first, the ground absorbs the oil from the colours so fast, that they are not so manageable as in oil-painting; secondly, the effect of the picture is not seen till the finishing varnish is laid on; and thirdly, as the effect is not seen till the picture is finished, it will sometimes disappoint the artist, and in that case it will be difficult, if at all practicable, to alter it.

As I believe the process I have described in the beginning of this paper is similar to that of Miss Prevost, the artists who are acquainted with her recipe, can ascertain whether my conjectures on this subject are right or not. I am certain at least that these difficulties occurred in my

attempts to paint, and to obviate them I adopted the following process:

I prepared the ground in distemper, and painted the dark parts in the way I have described; I then varnished the ground with the copal oil-varnish, till it was fully saturated; and by this means the full effect of that part of the picture was seen: upon this I painted the lighter parts with white, using much of the vehicle where the colour was thin, and little in the solid parts, leaving the white in ~~them~~ dead: by this means I understood the effect of my chiaro oscuro, as I saw the effect of the demi-tints nearly as well as when the picture was finished.

Upon this I glazed the colours in the way I have described in the beginning of this, and finished the picture. I often found (probably from want of practice) that the effect was different from what I intended, as the effect of the colours, added to that of the chiaro oscuro, produced an essential alteration in the whole; as I took care in general that the defect did not arise from too much white, I added more where it was deficient, and glazed fresh colours over it, which united perfectly with what had been done before, and did not give the appearance of a mended picture. If the defect was from too much white, I glazed on it a colour similar to that of the ground, painted with fresh white upon that, and glazed the proper colours over it. In this way I found I could alter the picture, but not so well as in the former case.

I found I could, when necessary, increase the effect of the picture, by painting on the principal mass or masses of light with the local colour, only mixed with white; as this practice brought those parts more forward by making them appear solid, and thus contrasting them with the

transparency of the rest of the picture. In this way I could use the colours tempered with copal varnish without difficulty; and, I believe, that if I had been accustomed to paint large pictures, I could have painted one as large as life with the same ease.



METHOD *and* PROCESS for TRANSFERRING PAINTINGS.

By Mr. ROBERT SALMON.*

THE first thing to be attended to, either for paintings on plaster walls or ceilings, or from boards, is, that the place in which they are, be secure from wet or damp. If the paintings are on old walls, in large buildings, and places where this cannot be attained by art, then the summer season should be taken for the purpose, as the picture would rarely escape damage if the wet or damp gets at it, while under the process; at the same time caution should be taken that the room or place be not over-heated, which would also produce equally bad effects: these precautions taken, the next thing is to examine the face of the painting. If there are any holes in the same, they must be carefully filled up with paste, or putty of glue and whiting: this, if the holes are large, should be twice or thrice done, so as to entirely fill up and leave the face even and smooth; but if there are any bruised places, with paint still remaining

* The Great Silver Pallat was voted to Mr. Robert Salmon for this Discovery, by the Society for the Encouragement of Arts, Manufactures and Commerce, Dec. 5, 1796.

on the face of the bruised parts, then this stopping must not be applied, but the securing canvass, hereafter described, be pressed down into these places. In the places that are stopped, there will, of course, appear blemishes, when the picture is transferred; but the process is rendered much more certain and sure by being so done. Attention must next be paid, to lay down any blisters, or places where the paint is leaving the ground: this is done by introducing, between the paint and the ground, some very strong paste of flour and water; and the face of the blistered paint being damped with a wet sponge or pencil, it may then be pressed with the hand home to the ground, to which it will then adhere; all the unsound places being thus secured, care must be taken to clear the face of any grease or dirt; as also of any particles of the paste that may happen to be left on the surface. The next thing is, to determine the size of the painting meant to be taken off; and if on a plain surface, a board of the size of the picture must be procured, of not less than an inch in thickness, and framed together with well-seasoned wood, in small pannels, smooth, and flush on one side; this done, a piece of fine open canvass must be provided, such as the finest sort used for hanging paper on: this canvass to be made somewhat larger than the picture, and so sewed together, and the seam pressed, that it be perfectly smooth and even. This is what I call the securing-canvass, which, being so prepared, is then stuck on the face of the picture with a paste made of strong beer, boiled till it is half reduced, and then mixed with a sufficient quantity of flour to give it a very strong consistence. To large pictures on walls or ceilings, the canvass must for some time be pressed, and rubbed with the hand as smooth as possible, working it from the middle to the outside, so as to make it tolerably tight; and observing, as it

dries, to press it with the hand or cloth into any hollow or braised places, so that it may adhere to every part of the painting: this done, it is left to dry, which it will mostly do in a day or two, when dry, a second canvass, of a stronger and closer sort, and of the same size as the other, is in like manner to be attached on the top of the first. This last will want very little attention, as it will readily adhere to the first; and, being dry, attention must be paid to the face thereof, to take off any small knots, or unevenness thereon; which done, the whole should be again covered with a thin paste of size and whiting; when dry, to be pumiced over, so as to make the whole perfectly smooth and even. The painting being thus secured, the board, already prepared to the size of the picture, is to be put with the smooth side against the face thereof, so as exactly to cover as much as is intended to be transferred. The edges of the canvass, which, as before directed, are left larger than the painting, are then to be pulled tight over, and closely nailed to the edge of the board. If the painting be large, either on ceiling or walls, the board must, by proper supports, be firmly fixed against the picture, so that it can readily be lowered down when the plaster and painting is detached.

The canvass and board being fixed, the paintings from walls or ceilings are to be freed, together with a certain portion of the plastering: this, with proper care and attention, may be readily done. If on a ceiling, the first thing is to make some holes through the plastering round the outside of the board and painting; and, with a small saw, to saw the plastering from one hole to another, till the whole is disunited from the other parts of the ceiling: this done, the workman must get at the upper side of the ceiling, where he must free the plastering from the laths, by break-

ing off the keys thereof: and, with a chisel, cut out the laths, whereby the plastering, together with the picture, will be left resting on the board and supports: if there be apartments over the ceiling, the readiest way will be to take up a few of the floor boards above; if next the skiff, means may always be found to get into the same; and, although at first this operation may appear difficult, yet it is presumed no difficulty will be found by any ingenious workman.

If the painting is on a brick or stone wall, the same must be cut away at top, and down the sides of the painting; and then, by means of chisels or saws in wood handled, of different lengths, the wall must be cut away quite behind the painting, leaving the same, together with the plastering, resting on the board; this operation may sometimes be done with a saw; or, if the wall be not thick, nor the other side of much consequence, the bricks or stones may be taken out from that side, leaving the plastering and painting as before; this last method I have not practised the other, of cutting away some part of the wall, I have, and see no difficulty, or very great labour in the operation; but that of course must be various, according to the texture of the wall and mortar.

If paintings are on curved surfaces, such as the cones of ceilings, then the only difference of operation is, that some ribs of wood must be cut out and boarded smooth to the curve of the surface of the painting, and then fixed up thereto in place of the before described bearing board; the painting is then to be freed, and left with the plastering, resting on the bearers.

For paintings painted on wainscot or boards, the same securing and process is exactly followed, only that, as the wainscot or board can always be cut to the size wanted,

or laid horizontal, the securing canvass is stretched thereon, and turned over the edges of the same, till it is dry; after which the edges are again turned up, and nailed to the board, in the same manner as those from walls.

Having, as before described in any of the aforementioned cases, freed the paintings from their original plates, you have then got them secured to two thicknesses of canvass; with their faces next and on to the board prepared for that purpose; which being the case, they can readily be removed to any room or shop, to be finished as follows: having got the painting into the shop or room, which should be moderately warm and dry, but by no means overheated, laying the board on a bench or trestles, the back of the picture will be uppermost, and the plastering or wood, as may happen, is then to be cleared away, leaving nothing but the body of paint, which will be firmly attached to the securing canvass; to perform this, a large rasp, a narrow plane and chisels will be requisite: this operation is difficult to describe, but would soon be learnt by any one who makes the attempt; nor is it very tedious; and, being performed, the picture is ready to be attached to its new canvass, as follows:

The painting being cleared, and laying on the board, the back thereof is to be painted successively, three or four times over, with any good strong-bodied paint, leaving each coat to dry before the other comes on; a day or two between each will generally be found sufficient; each of these coats, and particularly the first, should be laid on with great care, taking but a small quantity in the brush at a time, and laying it very thin: this precaution is necessary to prevent any of the oil or paint from seeping through any small cracks or holes that may happen to be in the face of the picture, which would run into the paste, and so

attach the securing canvass to the picture as to prevent its being afterwards got off. If any of these holes or cracks are observed, they should be stopped up with the glue and whiting paste, and the painting then repeated till a complete coat is formed on the back of the picture; and it is then ready for attaching to its canvass, which is done by spreading all over the picture a paste made of copal varnish, mixed with stiff white lead, and a small quantity of any other old fat paint; all which being spread equally over with a pallet knife, such a canvass as the first securing canvass is laid thereon, and strained and nailed round the edges of the board, in which state it is left till it becomes tolerably dry; and then a second canvass, of a stronger sort, must be in like manner attached on the first, and left till it is perfectly dry and hard. This mostly takes about two months; and the longer it is left, the more secure the painting will be attached to its canvass, and less liable to crack or fly therefrom. When sufficiently dry, all the four canvasses are to be unnailed from the board, and the edges turned up the reverse way, and nailed to a proper stretching frame; this is done by unnauling from the board a part on each side at a time, and immediately nailing it to the stretching frame, so as never to leave the canvass to rack or partially stretch, which would damage the picture; in this manner, by degrees, the cloths are entirely detached from the board, and firmly fixed on the stretching frame; the superfluous left larger than the frame, may then be cut off, and the wedges put in the frame, and moderately tightened up. There remains then only to clear the face of the painting from the securing canvass, which is done by repeatedly washing the face with a sponge, and moderately warm water; in doing this, no force or violence must be used; with frequent and gentle washings the paste will all

worked out with the sponge: the edges of the outer canvass is then to be cut round, and stripped off, and the other next the face of the picture is to be done in like manner; which done, there only remains to clear the paste clean off, and repair any defects; and the picture will be as strong as if painted on the canvass.

For taking pictures off walls, without taking the walls down, or cutting away more thereof than the plastering, the following process is proposed: the face of the picture to be first secured, in every respect, in the manner before described: instead of the plain board, a bearer should be prepared, with a convex surface, composed of ribs, boarded over, so as to form part of a cylinder, of not less than five feet radius, and as long as the height of the picture. This bearer being prepared, in order to apply it, a floor or platform should be erected, and placed horizontally, with its surface level, and its edge immediately in contact with the bottom of the picture meant to be transferred. The use of this platform is for the above-described bearer to rest and move upon; which bearer should be set on its end, with one edge in contact with the wall, at one side of the picture; consequently the other edge will be at some distance from the wall, according to the size of the picture and convexity of the bearer. Being thus placed, the superfluous edge of the securing-canvass should be turned over, and nailed to that edge of the bearer that is next the wall: this done, the operation of cutting away the plastering should be begun, which may be done with the corner and end of a short saw, by sawing between the brick-work and plastering, leaving the thickness, or part of the thickness of the plastering, on to the painting, fastened to the bearer; and when this edge of the picture is freed, the whole height, for nine or ten inches under, the edge of the bearer that is

furthest from the wall must then be gently forced nearer: consequently the other edge, together with the painting and plaster that is freed, will leave the wall, and give an opportunity of introducing the saw behind, and cutting away the same to a certain distance further under; and, by repeating this, the whole of the picture will at last be freed, and left on the bearer: each time the bearer is removed, and, as it is were, rolled on the vertical surface of the wall, care must be taken to turn and nail the securing-canvas on the top and bottom edges of the bearer, so as to secure the freed plastering and picture from moving about; and, lastly, before the bearer and painting be moved, to nail the other edge of the picture in the same way, which will secure the whole to the bearer: this done, the picture and bearer are at liberty to be moved to a proper place, in order to be freed from the remaining plaster; the edges may then be unnailed, and the painting and canvas slipped from this bearer on to a plain board, and the new canvas then put on, and remain till dry, as in other cases.

It may appear that the bending of the canvas and plastering to the convex bearer will crack the plaster, and damage the painting; but from experience I have observed, that, to a curve of such, or even less radius, plastering will bend, without any visible crack, even on the exterior part thereof; and that part next the bearer, not having occasion in bending to extend its parts, will consequently be much less liable to be disturbed by such bending.

OF PAINTING *on GLASS, or BACK-PAINTING.*

THIS manner of painting is executed with great facility; it gives all the *fineness* that can be desired, and is easy to work; there are no outlines to draw, nor shadows to infer, but your colours are put on without the trouble of either. The prints for this purpose are done in *mezzotinto*, but many of those well finished, engraved in the manner of chalks, are very proper, for their shadows being blended together, when rubbed on the glass, appear soft and united, as drawings in Indian ink: such prints to have their margin cut off: then on a piece of fine crown glass, very clean, the size of the print, and free from knots and scratches, lay some Venice turpentine on one side, quite thin and smooth with a painter's brush—lay the print flat in water; when thoroughly wetted, which requires twenty-four hours for some sorts of paper, but other sorts are ready in two hours, take it carefully out, and lay it between dry papers, that the superfluous water may be absorbed; next, lay the damp print flat on a table, with its face uppermost, then holding the glass over it, without suffering the turpentine to touch it till it is exactly even with paint, gently press the glass in several parts, and turning it, press the print with your fingers, drawing it from the center to the edges, till it is quite smooth and free from blisters: when this is done, wet the back of your print with a sponge till the paper will come off with your fingers; then rub it gently, and the white paper will roll off, only the ink which formed the impression, remaining. When dry, with a

camel-hair pencil, dipped in oil of turpentine, wet it all over, and it will be perfectly transparent; and fit for painting on: a sheet of white paper, placed behind, will contribute to its transparency. Lay the lighter colours first on the light parts of your print, and the darker over the shaded; and having once laid on the brighter colours, it is not material if the darker sorts are laid a little over them, for the first colour will hide those laid on afterwards.

The glass, when painted, must stand three or four days to dry, and be carefully covered from dust. The proper colours are these used in oil.

For ENAMEL GROUNDS.

THE matter of the enamel must be first finely levigated and searced; and the body to be enamelled should be made perfectly clean. The enamel must be then laid on as even as possible by a brush or pencil, being first tempered with oil of spike; and the distance of time betwixt the laying on the ground, and burning the piece, should not be too great; because the oil will exhale, and leave the matter of the enamel a dry incohering powder, which will be liable to be rubbed or shaken off by the least violence. This is the common method; but there is a much better way of managing this part of the work by means of a searce; in which the enamel is spread with very little trouble, and the greatest part of the oil of spike saved. The method of performing this is, to rub the surface to be enamelled over with oil of spike; and then, being laid on a sheet of paper, or piece of leather, to save that part of the enamel

which does not fall on a proper object, to scarce the matter upon the oiled surface till it lie of a proper thickness; but great care must be taken in this method of proceeding, not to shake or move too forcibly the pieces of work thus covered with the powdered enamel.

It is usual to add oil of turpentine to the oils of spike or lavender, in order to make them go further, and save the expence attending the free use of them; and others add also a little olive or linseed oil; or some, in the place of them, crude turpentine. The use of the spirit of turpentine is very allowable; for it is the same for this purpose as the oils of spike or lavender, except that it wants the glutinous quality which makes them serviceable in spreading the enamel: but, with respect to the use of the oils of olive and linseed, or any other substantial oil, it is very detrimental; tending to reduce the metalline calxes; and leaving a small proportion of black coal or ashes, which must necessarily injure the white colour of the ground.

When plates, as in the case of pictures, dial-plates, &c. are to be enamelled, they should always be made convex on the outside, and concave within; and all pieces of enamel, formed of metal, where the figure does not admit of their being thick and solid, should be of the same kind or form: otherwise they will be very apt to warp in the heat, and cannot be brought straight after they are taken out of the fire, without cracking the enamel. For this reason, likewise, it is proper to enamel the work all over, as well on the wrong as right sides, to prevent the heat from calcining the metal; which would both contribute to its warping, and weaken the texture of it.

The enamel being laid on the body to be enamelled, when the fixed muffle is used, the piece must be gently lifted on to the false bottom; and put in that state into the

muffle fixed in a furnace, by thrusting the false bottom into it as far as it will go: but it is better to defer this till the fire be perfectly in order, which may be known by putting a bit of tile or china, with some enamel on it, of the same tone with that used as a proof; and another proof of the same kind may be also put along with the work into the muffle; which, being taken out, may shew how the operation proceeds.

Pit-coal may be used in the furnace, where enamel is burnt with the fixed muffle, or in coffins, which is indeed one principal conveniency attending the use of them, as it saves a considerable expence of charcoal; but where the open muffle is used, charcoal alone should be employed, as the fumes of mineral coal are very detrimental to some colours, and destructive of the grounds, if whitened by arsenic, as the common white glass.

The colours being prepared, they must be reduced to powder by due levigation and washing over, where they are required to be extremely fine, and there is no unvitriified salt in the mixture. They must then be tempered on a China or Dutch tile, with oil of spike or lavender, to which most artists add likewise oil of turpentine, and some (but I think erroneously, as I have before-mentioned) a little linseed or olive oil, and in this state they are to be used as paint of any other kind; but it should be avoided to mix more of the colours with the essential oils than will be immediately used; because they dry away extremely fast, and would not only be wasted, but give a cohesion to the particles of the colours, that would make them work less freely when again diluted with oil.

The colours being thus laid on the pieces to be painted, the proceeding must be in all respects the same as with the grounds, in whatever manner they are to be burnt, either

in the muffles or coffins; but greater nicety must be observed with respect to the fire, as the effects of any error in that point are of much greater consequence in the burning the colours than the grounds; especially if the white of the grounds be formed from the calx of tin or antimony, and not arsenic.

Pit-coal, as was above observed, may be employed for burning as well the colours as the grounds, where the muffle or coffins are used; or any other method pursued that wholly hinders the smoke and fumes from having any access to the enamel.

Of ENAMEL PAINTING.

ENAMEL painting differs from all other kinds, in the vehicle employed for the colours (to hold the parts together, and bind them to the ground they are laid upon); this is glass, or some vitreous body, which being mixed with the colours, and fused, or melted, by means of heat, becomes fluid; and having incorporated with the colours in that state, forms together with them, a hard mass when grown cold: it answers, therefore, the same end in this, as oil, gum-water, size, or varnish, in the other kinds of painting.

The glass, or vitreous body, applied to this purpose of mixing with the colours, in order to bind them to the grounds, is called a flux; and makes one of the principal substances used in enamel painting: when this flux is easily fusible, that is to say, melts with a less degree of heat, it is in the stile of those who work in enamel said to be soft, and when it is reluctant to melt, and requires a greater degree of heat, it

is called hard: these terms are as well applied to the matter of the enamel grounds, and all other vitreous substances concerned as to the fluxes. It is, in general, a perfection of the flux to be soft, or run easily into fusion: but the great point with respect to this particular, is, that, when several mixtures of colours and fluxes are used at the same time, they should all correspond to each other in the degree of this quality; otherwise some would be rendered too fluid, and perhaps run the matter of the enamel ground into fusion, and mix with it, while others remained solid and insufficiently fused themselves. It is always necessary, likewise, that the enamel of the ground should be considerably harder than the mixtures for the colours; for, if they both melt with the same degree of heat, they will necessarily run together.

It being requisite that the body painted in enamel should undergo a heat sufficient to melt soft glass, the matter of such body can only be gold, silver, copper, porcelain, or china-ware, hard glass, and earthen-ware: and where the metals are used, if the painting be of the nature of a picture, or demand a variety of colours, it is necessary that a ground of white, or some other colour, should be laid on the metal; the body of which ground must necessarily be of the same vitreous nature as the flux, but harder, as nothing else can endure so great a heat that is capable of incorporating with, and binding the matter of the white, or other colour, to the surface of the metal. The ground, therefore, makes another principal substance used in enamel painting.

The third substance is the colour, which must likewise be a body capable of suffering the heat of melted glass; and such as will either itself be converted into glass, or kindly incorporate with it, in a melted state: this, of course,

confines the matter of such colour to metals, earths, or other mineral bodies; all vegetable and animal substances being calcined and analyzed, with a less degree of heat than the lowest sufficient to work enamel.

The fourth kind of substance is what I shall call the secondary vehicle, which is, some fluid body for laying on the ground, and working with the pencil, the flux and colours when mixed together; since, as they form only a dry powder, they could not be used as paint without some such medium; but as this is to serve only for spreading and laying on the matter of the enamel, and not, like other vehicles, to assist in holding the colours together, and binding them to the ground, (that being in this kind of painting the office of the flux) it is necessary that it should be some such substance as will evaporate and dry away without leaving any part behind; as it would otherwise be heterogeneous matter, with regard to the enamel, and consequently injurious to it. Essential oils have been therefore generally used for this purpose, as they have the quality of wholly drying away on the first approach of heat, together with a slight unctuousity, which renders them capable of making the matter of the enamel work properly with the pencil.

The preparation of these several substances have been in a great measure monopolized by the Venetians, except what were prepared at Dresden since the establishment of the China-manufactories. The few others who have had any knowledge of this matter, have practised the preparing only some kinds; and even at present there are, perhaps, none in this country who make more than a small part of the variety necessary; for, though many possess the knowledge of some particular articles, yet they are ignorant with regard to others, which are again, perhaps known to those

who are ignorant of these. As there has been hitherto no means afforded to the practisers of it, of learning the particulars of this art in a system, and a deeper knowledge of the principles and practice of chemistry is requisite to the attaining it without being taught, than could well fall to the share of painters or other artists, I shall, therefore, be more minute in my instructions for the making the several kinds of the grounds, fluxes, and colours, in order that they who are concerned in, or may be desirous to apply themselves to the art of painting in enamel, which is now become the basis of a considerable manufacture in this country, may furnish themselves with whatever is necessary in its greatest perfection.

Besides the knowledge of the preparation of the above substances, and of that part of the art of using them which belongs to painters in general, there is another requisite; this is the burning, as it is called, the grounds, in order to forming them on the body to be painted, or enamelled; as also the colours with the fluxes after they are laid on the grounds. What is meant by burning, is the giving such a heat to the matter, when laid on the body to be painted, as will fuse or melt it; and consequently give to the flux, or vitreous part of the composition, the proper qualities of a vehicle for binding the colours to the ground, and holding the parts together. As this requires a particular apparatus, I shall endeavour to shew the method of constructing it in the most expeditious and easy manner, and give such cautions for the conduct of the operation, both for burning the grounds and painting, as may best teach those who are less experienced in it, to attain to perfection in this art. It cannot be expected, nevertheless, considering the nicety of the subject, such directions can be given as will ensure success in the first trials, with regard to several of the pro-

cesses, or even the general operations; but whoever will make themselves masters of the principles on which they depend, which are all along intimated, will easily be able to correct their own errors.

A judgment formed by some little experience, is likewise requisite for the preparing well the colours with certainty; for as different parcels of the same substance vary frequently in their qualities with regard to the degree or proportion, it is necessary to make allowance accordingly in the proportion of the quantities in the mixtures: this cannot be done till some little previous trial be made; and the power of judging of them be gained by an experimental acquaintance with them; but as the materials in general are very cheap, and the experiments may be made in the same fire where actual business is done, whoever would excel in the art of preparing and using enamels, should take a considerable scope of experimental enquiry into the effect of all the various proportions and commixtures of the substances used.

Of the Substances used for forming Fluxes.

Minnum, or red lead, is used as a fluxing body, for forming the enamel for grounds; as also in compounding fluxes for the colours: it requires no preparation for these purposes; only it is proper it should be pure, which may be known by the method before given, page 34; this flux renders the enamel soft; but producing some proportion of yellow colour, is not fit for all uses.

Fixed alkaline salt of vegetables, is sometimes used also in forming the mixture for enamel grounds; as likewise in some compositions of fluxes for the colours; it makes a less

soft enamel than the lead, but is free from yellow, or any other colour, and therefore proper for some purposes.

Borax is a salt of very peculiar qualities; amongst which, is that of promoting vitrification, and the fusion of any glass when vitrified in a greater degree than any other substance known; on which account it is of the greatest consequence in forming fluxes for enamel. It requires, nevertheless, either to be previously calcined, or brought to a vitreous state, which it suffers from the application of moderate heat alone; and it must also be finely powdered before it be mixed with other ingredients in fluxes. Its use is not much known in common practice, though of the greatest consequence to the art of enamelling; as not only a set of softer colours may be produced by the aid of it, than can be otherwise had; but the degree of each may be brought to correspond by the employing it in different proportions, according to the respective hardness of the other ingredients, which differ so much, as not to be regulated justly by any other means.

Common salt may be also used as a flux in enamelling, particularly where there is occasion for glazings; as it is not only extremely fluid, and free of tenacity when used, but also less subject to crack than any other vitreous body whatever: but for fluxes for grounds and colours in enamel, it is not frequently necessary to multiply ingredients, as the above three substances may, when properly applied, sufficiently answer most purposes. The same reasoning extends to nitre and arsenic; which, though they have the qualities of fluxes, possess yet along with them such others, with respect to their effect on several of the substances that compose the colours, as renders the methods of using them difficult and complex.

Of the substances used for forming the body of enamel, or fluxes.

WHITE sand is used as a body for the fluxes and grounds of enamel: it should be reduced previously to an impalpable powder, in order that it may be mixed more intimately with the other ingredients, which not only accelerates the vitrification, but renders the glass much more perfect. The kind of sand proper for this purpose, is that brought from Lynn, in Norfolk, and is called by the name of that place.

Flints are used for the same purpose as the white sand; and it is proper to use them when that cannot be procured of the right kind. They require to be calcined before they are applied to any purpose of vitrification. This is to be done by putting them into any fire, and continuing them there till the whole substance become white, when they must be taken out; and, while in their full heat, immersed in cold water, and kept there for some time. By such treatment they will be rendered of a very brittle and calcareous texture, and very easy to be powdered, which must be done to a perfect degree, for the reason above given. Where small quantities of the matter of any kind of enamel is to be prepared, calcined flints are preferable to sand; as they are much more easily reduced to an impalpable powder, and the trouble of the previous calcination is very little.

There is a sort of stone, which the French call *millon*, that forms the upper crust, and lies round the free-stone in most quarries. This stone will lose its tenacity in a moderate fire; and, when calcined, runs much sooner into vitri-

fication than either flints or sand: it is therefore, when it can be obtained, a better matter for the body of fluxes, or soft enamel, than either of the other. It will, with the same proportion of the fluxing ingredients, make a much softer flux; or, it otherwise admits of the diminution of the proportion of some of them; which, for many experimental reasons, is, in certain cases, an advantage.

*Of the substances used for producing a white colour in enamel,
for forming the grounds.*

PUTTY, or calcined tin, is used as a body of colour for the enamel grounds. As tin is very troublesome in calcination, requiring a long continuance of fire, and to be spread into a very thin surface, it is much the best way to procure it for the purposes of enamelling readily calcined, of those who make it their proper business to calcine it for the use of lapidaries, and other artists who use it; for they have large furnaces, fitly constructed for performing that operation in large quantities; and can consequently afford it much cheaper than it can be prepared in small quantities; besides the sparing the trouble. It must be demanded of them by the name of putty; and care must be taken that it be not sophisticated, which it seldom fails to be before it comes out of their hands for common purposes. The sophistication, which is generally by chalk, lime, or some such white earth, may be thus distinguished:—put the putty into a crucible with some tallow or other grease; and give it the heat of fusion, or what is sufficient to melt it, supplying the grease in fresh quantities as it burns away, till the calcined tin appears to have regained its metallic state. Suffer then the remainder of the grease to burn away; and

the chalk or earth, if any, were mixed with it, will be found swimming on the surface of the metal; to which, however, the ashes of the grease must be supposed to have added some little quantity: there is, nevertheless, another body with which the putty or calx of tin may be adulterated, that will not discover itself by this method of reduction of the tin: it is white lead, which, in this manner of treatment, would run into fusion, and mix with the tin; and could therefore not be distinguished from it: but it may be easily rendered perceptible by another manner of proceeding; which is, to take the putty suspected to be adulterated with it, and having put it into a crucible without any admixture, and inverted another crucible over it as a cover to give it a moderate heat, carefully avoiding that the smoke or coat of the fire may have any access to it to change its colour. If there be any white lead mixed with the putty, it will shew itself, when removed from the fire, and become cold in a yellow or brown colour. If no such colour supervene, but the putty appear equally white as before it was heated, a conclusion may be safely made, that it was not adulterated by white lead; or that, if sophisticated at all, it must be by some white earth, which may be made perceptible by the reduction of tin in the manner before-mentioned.

Ultramarine (the preparation of which we have before given) is used in enamel, where very bright blues of a lighter tint are wanted; and, sometimes indeed, in other cases, by those who do not understand the right use of zaffer and smalt: but there are few instances where zaffer, when perfectly good, fluxed with borax and a little calcined flint, or Venetian glass, to take off the fusible quality of the borax, will not equally well answer with the best ultramarine: the ultramarine requires no preparation when used.

in enamel painting, previously to its being mixed with the proper flux; and what relates to its general qualities, and the means of distinguishing its goodness or genuineness, we have, along with its preparation, before taught, folio 41, and following pages.

Ultramarine ashes are used, where light semi-transparent blues are wanted; but they are so frequently adulterated with precipitations of copper, which, of course, turn green on fluxing, that it is very necessary, to be cautious in the use of any parcel not previously tried.

Zaffer is used for producing blue, green, purple, and black colours in enamel: it is an earth obtained by calcining a kind of stone, called cobalt; and when it is mixed with any kind of vitreous bodies, it vitrifies, at the same time assuming a strong blue colour; but for the most part verging to the purple; it is to be had in a state proper for use, of those colourmen who make it their particular business to supply the glass-makers with colours. The goodness of zaffer can scarcely be known but by an actual trial of it; and comparing the effect of it with that of some other known to be good, and used in the same proportion.

Magnesia is an earth, which, when fluxed with any vitreous body, produces a broken crimson, or foul rose-colour. It is to be had, prepared, fit for use, except a more perfect levigation, from those who sell colours to the glass-makers. It is useful not only for some purposes as a red, but for the several compositions for black, purple, and some browns. The goodness of the magnesia must be determined by the same means as that of zaffer.

Smalt is, as before-mentioned, zaffer vitrified with proper additions, which are generally fixed alkaline salts and sands, or calcined flints, which are sometimes used as a blue in enamel; but being hard, it requires, for such purposes, to

be tiled with a flux, which, increasing the body of glass in too great a proportion for the tinge, is apt to dilute the colour too much where great force is wanted; therefore the use of the zaffer itself is in most cases preferable. There have nevertheless been, as was above observed, some parcels of smalt, or vitrified calx of cobalt, brought from Saxony, which are of an extreme strong body of colour, and will bear any proportion of flux necessary to render them as soft as may be required, without weakening the colour too much for any purpose. Common smalt, however, ground very fine, and mixed with a fourth part of its weight of borax, (which is much the most powerful and kindly flux for zaffer), will run pretty well, and may be used where either a full colour is not demanded, or where the work will admit of the colours being laid on thick. The goodness of smalt may be judged of by its bright and deep colour; and the less it inclines to the purple the better. In order to judge of the strength of the colour, the smalt should be reduced to a fine powder; for, in a grosser state, every degree of fineness renders it so different, that a judgment cannot be easily formed of it. Smalt is to be had of all colourmen, and is not subject to any adulterations which would not be obvious on inspection.

Gold is used in enamel to produce a crimson, or ruby colour; which, by the mistaken sense of the Latin word *purpureus*, has been called purple by all the English and French writers. It must be previously reduced to the state of a precipitated powder, by dissolving in *aqua regia*, and making a precipitation by means of tin, fixed alkaline salt, or some other metallic, or alkaline body.

Silver is used for producing a yellow colour in enamel. It must be previously reduced to the state of a powder, which may be done either by precipitation from spirit of

nitre, or by calcination with sulphur. The precipitation of silver from spirit of nitre, may be performed by dissolving an ounce of silver in two or three ounces of spirit of nitre, and precipitating and edulcorating it.

Copper is used in enamel painting, for the forming green, blue, and red colours; but it must be previously either calcined, or reduced to the state of a powder by precipitation.

Iron is used to produce an orange red, or foul scarlet colour in enamel; as also a transparent yellow; and to assist, likewise, in the formation of greens, and other compound colours. It is prepared many ways, both by corrosion and precipitation; some of which, indeed, make a real difference, but most of them lead to the same end.

Antimony is used for producing a yellow colour in enamel, as well as the white before-mentioned; and, indeed, it is the most useful, and most used of any substance whatever for that purpose. It is prepared only by levigation; to which its texture, notwithstanding its being a semi-metal, very well suits.

Glass of antimony is also used sometimes in enamel painting; being itself a fine transparent orange colour. But as it wants body, it has no great effect but in compositions.

Orpiment has been also used in enamel for producing a yellow colour; but it is very tender with regard to the fire, and requires so soft a flux, while, at the same time; antimony, properly managed, will so well supply the place of it, that it is rarely used.

Powdered bricks have been also used for compounding yellow colours in enamel; but as they act only in consequence of the oker they contain, they are certainly inferior to the prepared okers we have given.

The most active flux amongst salts is borax; which, indeed, possesses this power in the greatest degree hitherto known of any simple whatever. The next is lead, which vitrifies with a very moderate degree of heat, and assimilates to glass with itself, not only many kinds of earth, but all metals and semi-metals, except gold and silver in their entire state. Arsenic is the next powerful flux, only it requires to be fixed, by conjoining it with some other body already vitrified; otherwise it sublimes and flies away before it arrives at the vitrescative heat. The several kinds of salts have the next degree of fluxing power; and among them sea salt possesses the greatest; but they are not sufficiently strong themselves to form an enamel flux, soft enough to be used in painting; though, as they are colourless, which is not the case of vitrified lead, they are very necessary to be compounded with lead; or used in its place, assisted by borax, where absence of every degree of colour is necessary in the flux.

OF ETCHING.

ETCHING is a method of working on copper, where the lines, instead of being cut with a graver, are eaten with *aqua fortis*.

The art is executed with more ease and freedom than engraving, giving a greater degree of spirit and character to several kinds of objects than can possibly be produced by the graver alone; and as it is peculiarly adapted to the purpose of imitating drawings, the study of it is recommended to those amateurs who may wish to multiply their

own designs, or copy those of others: we shall therefore give such directions, as will enable any person ^{to} ^{use} ^{the} ^{art} ^{of} ^{drawing}, to practise that art with success.

The principal materials are, the plate, the etching ground, or varnish, a dabber, turpentine varnish, lamp black, soft wax, and *aqua fortis*. The tools are, an oil rubber, a burnisher, a scraper, a hand vice, etching boards, etching needles of various sizes, an oil stone, and a parallel ruler.

Having procured from a copper-smith a plate, rather larger than the drawing you intend to copy, screw to it a small hand vice, having a piece of paper between to prevent the teeth of the vice injuring the copper: then hold it over the flame of twisted paper, or a charcoal fire, the back of the plate to the flame, till it is sufficiently heated to melt the etching ground or varnish, but not to burn it; then with the dabber made of cotton wool, tied in silk, dab it till it is perfectly even: afterwards, take a large candle, and smoke it; when the varnish is perfectly and equally black, let it cool.

When this is effected, the picture, drawing, print, &c. which you wish to copy, must be traced in the manner following: take oiled paper, lay it upon the drawing, and with a black lead pencil trace the outlines correctly; before you take it entirely away, lift up one of the corners, and pass a piece of clean writing paper underneath to observe if there be any thing omitted. When this is completed, take a bit of linen rag, or cotton, dipped in the scrapings of red chalk, or vermilion, and rub it over the back of the tracing; then shake off the loose powder, and wipe it gently with a soft linen rag; place the red side upon the plate, making it fast at each corner with a bit of soft wax. Lay your etching board under your hand to prevent bruising

the ground, then with a blunt etching needle, trace lightly the outlines till the marks of them appear upon the ground, which you must take care not to penetrate by tracing too hard. As great nicety is required in this part of the work, it will be necessary often to lift up one of the corners of the plate to examine whether every part be marked upon the ground, before you take it off, as it will be extremely difficult to lay it down again in its former position; this being done, take off the paper, and the plate is prepared for etching.

In general it is most convenient to begin with the distant objects, taking great care that they be not etched with too blunt a point, proceeding by degrees to those which are on the fore ground, and consequently marked in the strongest manner: the needles must be properly adapted for each part; the lines upon the near objects being wider from each other than those farther from the eye. To prevent the ground being damaged by the hand in etching, it is usual to place a silk, or soft linen handkerchief next the plate to rest the hand upon; but many persons make use of a bridge or rest, made of a flat board, raised rather above the surface of the plate by small blocks at each end, which is by far the safest mode.

When all parts of the subject are etched, proceed to the biting or corroding in the following manner:—Take engravers' wax, composed of bees wax, softened with oil, and make it into a long roll; and at one corner, or some convenient part, make a spout to pour off the aqua fortis from the acid, composed of spirit of nitre, diluted with water, upon the plate, when, if there are bubbles which rise fast with a hissing noise, it is too strong, and more water must be added: when the acid has lain upon the plate half an hour, pour it off; wash the plate with water, and, by taking a

small part of the varnish from the work, examine it if it be sufficiently deep; if not, ~~stop out~~ the part examined with a little mastic or turpentine; varnish and pour on the acid till it produce the proper colour.

The subject must thus be examined several times during the process of the biting, till every part is of a proper strength; when this is the case, the aqua fortis is poured off, the wax taken from the plate, the varnish washed from the surface by spirits of turpentine, and the work will be seen complete.

GENERAL OBSERVATIONS.

Be careful that your acid be not too strong, which will break up the varnish, and make the lines rough and wide; it will be best to try the strength upon a spare bit of copper. The brushing off the air-bubbles as they arise upon the surface of the plate, contributes to make the work clear and regular; without this, the dark parts bite too fast and violent for the faint ones. On taking off the varnish, the plate often appears stained and tarnished; this is restored to its colour by an oil rubber made of broad cloth, rolled into a convenient form, with which the plate is polished.

Any part of the work which has not properly bitten, is repaired by the graver.



Method of MAKING the ETCHING GROUND *or VARNISH.*

TAKE of virgin wax and asphaltum, each two ounces; of black pitch and Burgundy pitch, each half an ounce: melt the wax and pitch in a new earthen-ware glazed pot; and add to them, by degrees, the asphaltum finely powdered. Let the whole boil till such time as that, taking a drop upon a plate, it will break when it is cold, on bending it two or three times between the fingers. The varnish being then enough boiled, must be taken off the fire; and letting it cool a little, must be poured into warm water, that it may work the more easily with the hands, so as to be formed into balls, which must be rolled up, and put into a piece of taffety for use.

It must be observed, first, that the fire be not too violent, for fear of burning the ingredients; a slight simmering will be sufficient: secondly, that while the asphaltum is putting in, and even after it is mixed with them, the ingredients should be stirred with them continually with the spatula; and thirdly, that the water into which this composition is thrown, should be nearly of the same degree of warmth with it, to prevent a kind of cracking that happens when the water is too cold.

The varnish ought always to be harder in summer than in winter; and it will become so if it be suffered to boil longer, or if a greater proportion of the asphaltum or brown resin be used. The experiment above-mentioned, of the drop, suffered to cool, will determine the degree of hardness or softness that may be suitable to the season when it is used.

Of ENGRAVING.

ENGRAVING is the making correspondent to some delineated figure or design, such concave lines on a smooth surface of copper, either by cutting or corrosion, as render it capable, when charged properly with any coloured fluid, of imparting by compression an exact representation of the design to paper or parchment.

The principal instruments used in engraving with the tool are, gravers, scrapers, a burnisher, an oil-stone, and a cushion for bearing the plates.

Gravers are made in several forms with respect to the points, some being square, others lozenge; the square graver for cutting broad and deep, and the lozenge for more delicate and fine strokes and hatches. La Boffe recommends, as the most generally useful, such as are of a form betwixt the square and lozenge: and he advises, that they should be of a good length; small towards the point, but stronger upwards, that they may have strength enough to bear any stress there may be occasion to lay upon them: for if they be too small and mounted high, they will bend; which frequently causes their breaking, especially if they be not employed for very small subjects.

The burnisher is used to assist in the engraving on some occasions, as well as to polish the plates. It is seven inches in length, and made of fine steel, well polished. The burnisher is formed at one end, and a scraper on the other, each about an inch and a half long from the point: betwixt them, about four inches of the instrument is made round,

and serves as a handle; and is thicker in the middle than at the necks where the burnisher and scraper begin, which necks are only one quarter of an inch in diameter. The principal application of it in engraving, besides its use in polishing the plates, is to take out any scratches or accidental defacings that may happen to the plates during the engraving; or to lessen the effect of any parts that may be too strongly marked in the work, and require to be taken down.

A cushion, as it is called, is likewise generally used for supporting the plate in such a manner, that it may be turned every way with ease. It is a bag of leather filled with sand, which should be of the size that will best suit the plates it is intended to bear. They are round, and about nine inches over, and three inches in thickness.

The cushion, made as above directed, being laid on the table, the plate must be put upon it; and the graver being held in the hand in a proper manner, the point must be applied to the plate, and moved in the proper direction for producing the figures of the lines intended; observing, in forming straight lines, to hold the plate steady on the cushion; and where they are to be finer, to press more lightly, using greater force where they are to be broader and deeper. In making circular and other curve lines, hold your hand and graver steadily; and as you work, turn your plate upon the cushion against your graver, otherwise it will be impossible for you to make any circular or curved line with that neatness and command of hand you by this means may. After part of the work is engraved, it is necessary to scrape it with the scraper or graver, passed in the most level direction over the plate to take off the roughness formed by the cutting of the graver; but great care must be taken not to incline the edge of the scraper or tool

used, in such a manner that it may take the least hold of the copper, as it would otherwise produce false strokes or scratches in the engraving: and that the engraved work may be rendered more visible, it may afterwards be rubbed over with a roll of felt dipped in oil. In using the graver, it is necessary to carry it as level as possible with the surface of the plate; for otherwise, if the fingers slip betwixt them, the line that will be produced, whether curve or straight, will become deeper and deeper in the progress of its formation, which entirely prevents strokes being made at one cut, that will be fine at their extremities, and larger in the middle; and occasions the necessity of re-touching to bring them to that state: for this reason, it is very necessary for those who would learn to engrave in perfection, to endeavour, by frequent trials, to acquire the habit of making such strokes both straight and curving, by lightening or sinking the graver with the hand, according to the occasion. If, after finishing the design, any scratches appear, or any part of the engraving be falsely executed, such scratches, or faulty parts, must be taken out by the burnisher, and further polished, if necessary, by the above-mentioned roll.

The plate being thus engraved, it is proper to round off the edges, by using first a rough file, and afterwards a smoother, and to blunt the corners a little by the same means: after which, the burnisher should be passed over the edges to give it a farther polish.

The dry point, or needle, which has been of late much used in engraving, is a tool like an etching point, which being drawn hard on the copper, cuts a stroke; and raises a burr: the burr is scraped off, and there remains a stroke more soft and delicate than can be produced in any other way.

In the conduct of the graver and dry point consists all the art; for which there are no rules to be given; and the

ing on the habitude, disposition, and genius of the artist: however, besides the explanations already given, some general observations and directions may not be improper: as the principles of engraving are the same with those of painting, a person cannot expect to attain any considerable degree of perfection in this art who is not a good master of design; and therefore he ought to be well acquainted with both perspective and architecture: for the former, by the proper gradations of strong and faint colours, will enable him to throw backwards the figures and other objects of the picture or design which he proposes to imitate; and the latter will teach him to preserve the due proportion of its several orders, which the painter often entrusts to the discretion of the engraver. In order to preserve equality and union in his works, the engraver should always sketch out the principal objects of his piece before he undertakes to finish them. In working, the strokes of the graver should never be crossed too much in a lozenge manner, particularly in the representation of flesh, because sharp angles produce the unpleasant effect of lattice-work, and take from the eye the repose which is agreeable to it in all kinds of picturesque designs: we should except the case of clouds, tempests, waves of the sea, the skins of hairy animals, or the leaves of trees, where this method of crossing may be admitted: but in avoiding the lozenge, it is not proper to get entirely into the square, which would give too much of the hardness of stone. In conducting the strokes, the action of the figures, and of all their parts, should be considered; and it should be observed how they advance towards, or recede from the eye: and the graver should be guided according to the ridges or cavities of the muscles or folds, making the strokes wider and fainter in the light, and closer and firmer in the shades. Thus the figures will not appear jagged:

and the hand should be lightened in such a manner, that the outlines may be formed and terminated without being cut too hard: however, though the strokes break off where the muscle begins, yet they ought always to have a certain connection with each other, so that the first stroke may often serve by its return to make the second, which will show the freedom of the engraver.

In engraving the flesh, the effect may be produced in the lighter parts and middle tints, by long pecks of the graver, rather than by light lines, or by round dots: or by dots a little lengthened by the graver; or, best of all, by a judicious mixture of these together.

In engraving the hair and the beard, the engraver should begin his beard by laying the principal grounds, and sketching the chief shades in a careless manner, or with a few strokes; and he may finish it at leisure with finer and thinner strokes to the extremities. When architecture or sculpture is to be represented, except it be old and ruinous buildings, the work ought not to be made very black; because, as edifices are commonly constructed either of stone or white marble, the colour, being reflected on all sides, does not produce dark or brown shades as in other substances. White points must not be put in the pupils of the eyes of figures, as in engravings after paintings; nor must the hair or beard be represented as in nature, which makes the locks appear flowing in the air; because in sculpture there can be no such appearances.

In engraving cloths of different kinds, linen should be done with finer and closer lines than other sorts, and be executed with single strokes. Woollen cloth should be engraved wide, in proportion to the coarseness or fineness of the stuff, and with only two strokes; and when the strokes are crossed, the second should be smaller than the

first, and the third than the second. Shining stuffs, which are generally of silk or satin, and which produce flat and broken folds, should be engraved more hard and more straight than others, with one or two strokes, as their colours are bright or brown; and between the first strokes other smaller must be joined, which is called interlining. Velvet and plush are expressed in the same manner, and should always be interlined. Metals, as armour, &c. are also represented by interlining, or by clear single strokes. In architecture, the strokes which form the rounding object should tend to the point of sight; and when whole columns occur, it is proper to produce the effect as much as possible by perpendicular strokes. If a cross stroke is put, it should be at right angles, and wider and thinner than the first stroke. In engraving mountains, the strokes ought to be frequently discontinued and broken, for sharp and craggy objects; and they should be straight, in the lozenge manner, and accompanied with long points or dots; and rocks should be represented by cross strokes more square and even. Objects that are distant towards the horizon should be kept very tender, and slightly charged with black. Waters that are calm and still are best represented by strokes that are straight, and parallel to the horizon, interlined with those that are finer; omitting such places as, in consequence of gleams of light, exhibit the shining appearance of water; and the form of objects reflected from the water, at a small distance upon it, or on the banks of the water, are expressed by the same strokes, retouched more strongly or faintly as occasion may require, and even by some that are perpendicular. For agitated waters, as the waves of the sea, the first strokes should follow the figure of the waves, and may be interlined, and the cross strokes ought to be very lozenge. In cascades, the strokes should follow the fall,

and be interlined. In engraving clouds, the graver should sport when they appear thick and agitated, in turning every way according to their form and their agitation. If the clouds are dark; so that two strokes are necessary, they should be crossed more lozenge than the figures, and the second strokes should be rather wider than the firsts. The flat clouds, that are lost insensibly in the clear sky, should be made by strokes parallel to the horizon, and a little waving; if second strokes are required, they should be more or less lozenge; and when they are brought to the extremity, the hand should be so lightened, that they may form no outline. The flat and clear sky is represented by parallel and straight strokes, without the least turning. In landscapes, the trees, rocks, earth and herbage, should be etched as much as possible; nothing should be left for the graver but perfecting, softening, and strengthening. The dry point produces an effect more delicate than the graver can, and may be used to great advantage in linen, skies, distances, ice, and often in water, especially in small engravings. In most things it is proper to etch the shadows, only leaving the lightest tints for the dry point, graver, &c.

CHALK DRAWINGS.

To imitate chalk-drawings, a mixture of varied and irregular dots are used, made more or less soft, so as to resemble the grain produced by the chalks on paper. Every stroke of the chalks on paper may be considered as an infinite number of adjoining points, which are the small continuances of the grain of the paper touched by the chalk in passing over it. When the copper-plate has been polished and varnished, or properly prepared, as in the common method of engraving, the drawing to be imitated may be

counterproved on the varnish of the plate. If this cannot be conveniently done, black-lead pencil, or red-chalk, must be applied to varnished or oiled paper; and by means of this chalk or pencil, all the traces of the original will be transferred to the varnish. The outlines of the varnish must be formed in the etching by points, whose magnitude and distance must be determined by the quality of the strokes in the original drawing. The artist may be provided with pointed instruments, or needles of various sizes, with single or double points. In forming the light and shade, he should distinguish between those hatches which serve to express the perspective of the object, and those which form the ground of it. The principal hatches should be more strongly marked; the middle tints, if etched, should be marked lightly, or they may be left till the varnish is taken off, and be perfected with a greater degree of softness, by needles, or the point of the graver, as the original may require. There is nothing peculiar in the method of applying the *aqua fortis* in this kind of engraving; but it may be observed, that it should not be left so long as to corrode the lighter parts too much: if the light parts are sufficiently corroded, they may be stopped out with turpentine varnish, and lamp-black mixed together; and the *aqua fortis* may be applied again to the stronger parts; for it will be no detriment to them, if the points which compose the shade burst into one another, provided the extreme be avoided. When the work of the *aqua fortis* is finished, and the varnish taken off the copper, it will be necessary in the softest parts, such as the flesh, &c. to interstipple with proper points; as an effect will be thus produced more delicate, than it is possible to attain with the *aqua fortis* only; and the strongest shades will require additional strength to be given them with small strokes of the graver. Drawings

made with chalks of different colours may be imitated in this manner, if a plate be provided for every colour. This method of engraving is intended to form a kind of deception, so that the connoisseur may not be able, on the first inspection, to distinguish between the original drawing and the engraving made in imitation of it; and it is extremely useful, as it serves to multiply copies of drawings left by those masters who excelled in the use of chalks, and thus to form and improve young artists, who could not have access to the originals in the practice of drawing.

OF MEZZOTINTO-SCRAPING.

THIS art, which is of late date, is recommended to the practice of the ingenious reader, for the amazing ease with which it is executed, especially by those who have any notion of drawing.

Mezzotinto prints are those which have no etching or strokes of the graver, but whose lights and shades are blended together, and appear like a drawing of Indian ink.

The tools used in this art are, the copper-plate, oil-stone, grounding-tools, scraper, burnisher, and needles.

Directions for laying the mezzotinto ground.—Mark off upon the bottom of the plate the distance you intend to leave for the writing, coat of arms, &c. then, laying your plate with a piece of swanskin flannel under it, upon your table, hold the grounding-tool in your hand perpendicularly; lean upon it moderately hard, continually rocking your hand in a right line from end to end, till you have wholly covered the plate in one direction; next, cross the strokes

from side to side; afterwards from corner to corner, working the tool each time all over the plate in every direction, almost like the points of a compass, taking all possible care not to let the tool cut (in one direction) twice in a place. This done, the plate will be full; or, in other words, all over rough alike, and would, if it were printed, appear completely black.

Having laid the ground, take the scrapings of black chalk, and, with a piece of rag, rub it over the plate; or you may, with two or three candles, smoke it as before directed for etching.

Now, take your print or drawing, and having rubbed the back with red chalk dust, mixed with white lake, proceed to trace it.

Directions for whetting the grounding-tool:—If a tooth of the tool should break, it may be perceived in the working by a particular streak or gap, which will appear in the ground in a straight line; in which case the tool must be whetted on the back, holding it sloping, and in a circular manner, like the bottom of the tool.

Directions for scraping the picture:—Take a blunt needle and mark the outlines only; then, with a scraper, scrape off the lights in every part of the plate, as clean and smooth as possible, in proportion to the strength of the lights in your picture, taking care not to hurt your outlines, and that you may the better see what you do with the thumb and fore-finger of the left hand, hold a piece of transparent paper, sloping, just over your right hand, and you will soon be a judge of the different tints of the work you are doing, scraping off more or less of the ground, as the different strengths of light and tints require.

The use of the burnisher is to soften, or rub down, the extremely light parts, after the scraper is done with, such

as the tip of the nose, forehead, linen, &c. which might otherwise, when proved, appear rather misty than clear.

Another method used by mezzotinto-scrapers, is, to etch the out-lines of the original, as also of the folds in drapery, marking the breadths of the shadows by dots, which, having bit of a proper colour with *aqua fortis*, according to the directions given, p. 177, take off the ground used in etching, and having laid the mezzotinto-ground as in page 188, proceed to scrape the picture as above. Four or five days before you think the plate will be ready for proving, notice must be given to the rolling-press printer to wet some French paper, as no other will do for this work; and as that time is necessary for it to lie in wet. When the proof is dry, touch it with white chalk where it should be lighter, and with black chalk where it should be darker; and, when the print is re-touched, proceed as before for the lights; and for the shades, use a small grounding-tool, as much as you judge necessary to bring it to the proper colour; and when you have done as much as you think expedient, prove it again, and so proceed to prove and touch till it is entirely to your mind. When the plate tarnishes in the part where you are at work, a little vinegar and salt, kept by you in a vial, will take it off, wiping it dry with a clean rag.

Avoid, as much as possible, over-scraping any part before the first proving, as by this caution the work will appear the more elegant.

AQUATINTA,

A METHOD of etching on copper, lately invented, and by which a soft and beautiful effect is produced, resembling a fine drawing in water-colours or Indian ink. Previous to the operation upon the plate, the following powder must be prepared. Take equal parts of asphaltum and fine transparent resin, and powder them separately in a mortar. Through a muslin-sieve, sift upon a sheet of paper a thin stratum of the asphaltum, above which sift a similar layer of the resin, and upon this another layer of asphaltum, continuing these alternate layers till both of the powders are exhausted. Then pass the mixture both together through the same sieve so as to mix them sufficiently for use. Some, instead of the above mixture, use powdered gum sandarach only.

The process is as follows: A copper-plate being polished in the usual way, lay the etching ground upon it, and etch the outlines of your design in the same manner directed under the article Etching. The ground is then to be softened with a little grease, and wiped off with a piece of rag; leaving, however, as much grease upon the plate as just to dim the copper. Next, sift the powder, upon the surface of the plate; after which, strike the other side of it pretty smartly against the edge of a table to discharge it of loose powder. This done, with a hand vice hold the back of the plate over a chaffing-dish of burning charcoal, till it become so hot as to give pain upon being touched with the back of the hand; and the powder which adhered to the

grease will now be fixed to the plate. The plate being then suffered to cool, take turpentine varnish, mixed with ivory black; and with a hair pencil dipped in it, cover all the lights or places where there is no work or shade. A rim or border of bees-wax is now to be raised round the plate; and, having reduced a quantity of *aqua fortis* to a proper strength with water, pour it on, and let it stand five minutes for the first or lightest shade; after which, pour it off; and, having washed the plate with water, set it edgewise to dry. Then with varnish stop out all the light shades; pour on the *aqua fortis* for the second tint, and let it stand five minutes more; proceeding in the same manner for every tint till you produce the darkest shades. If a bold open ground is wanted in any part, this requires an after operation. The ground must be laid as in the other case, by sifting on the powder; only this powder must be much coarser, and the plate more heated, in order that the particles of the powder may spread, and form small circles: even good clean rosin will do by itself. In etching landscapes, the sky and distant objects are also performed by a second operation, and the powder is sifted upon the plate with a finer sieve. If the trees, or any part of the foreground require to be finished higher, the plate must be entirely cleansed from grease with bread, and a ground laid in the common way of etching; when you may finish as highly and neatly as you please with the needle or point, by stippling with dots, and biting in those parts, or by a rolling-wheel, which is more expeditious.

If different colours are to be expressed in *aqua tinta*, there will be required so many different plates, each having only that part etched upon it which is designed to be charged with its proper colour. It may happen, however, in particular subjects, that some of the colours are so

stant from each other as to allow the printer room to rub them in without blending; in which case, two or three different colours may be printed from the same plate at once. Where different plates are necessary, a separate one, having a pin in each corner, must be provided as a top or bottom to the *aquatinta* plates; and these again must be exactly fitted, having each a small hole in their corners for passing over the pins of the sole: the said pins serving the double purpose of retaining the plates successively in their due position, and of directing the printer in placing the paper exactly on each plate so as not to shift; by which means each tint or colour will be exactly received on its proper place. This is the method practised in France. A landscape, or any similar subject, may be printed off at once in its different proper colours, by laying these upon the plate. In this case, the colours must be pretty thick in their consistence; and the plate must be carefully wiped in the usual way after the laying on of each tint, as well as receive a general wipe when charged with all the tints.

The art of engraving in *aquatinta* is kept a secret by those artists who practise it. In order to succeed in it, great care and judgment are requisite; and much depends upon a certain nicety of management, which is only attainable by practice.

OF CUTTING on WOOD.

THIS business is neither properly sculpture nor engraving; but being applied to many of the purposes of the latter, claims affinity to it. The smoothest grained woods are the best, such as pear-tree or beach; but above all, box. The fur-

face being prepared, a thin coat of white lead, tempered with water, is passed over it: the outlines of the design are traced with a black lead pencil or ink, and the design is laid on the block, then wetted, and rubbed on the back till the lines traced are transferred to the white lead, which shews them plainly; then the blank parts are cut away with sharp knives, small chissels, or gravers as required.

This kind of work differs from engraving on copper, in that the parts of the copper which are cut out, hold the ink, and form the impressiion; in this the parts which remain being prominent perform the same business. They are printed as letter-press.

Of JAPANNING.

BY Japanning is to be here understood the art of covering bodies by grounds of opaque colours in varnish; which may be either afterwards decorated by paintings or gilding, or left in a plain state. This is not at present practised so frequently on chairs, tables, and other furniture of houses, except tea-waiters, as formerly: but the introduction of it for ornamenting coaches, snuff-boxes, and skreens, in which there is a rivalry betwixt ourselves and the French, renders the cultivation and propagation of this art of great importance to commerce. I shall, therefore, be more explicit in shewing the methods, both now, and formerly in use, with the application of each to the several purposes to which they are best adapted; and point out, at the same time, several very material improvements, that are at

present enjoyed only by particular persons ; or not at all hitherto brought into practice.

The substances which admit of being japanned are almost every kind that are dry and rigid, and not too flexible ; as wood, metals, leather, and paper prepared.

Wood and metals do not require any other preparation, but to have their surfaces perfectly even and clean : but leather should be securely strained either on frames, or on boards ; as its bending, or forming folds, would otherwise crack and force off the coats or varnish. Paper also should be treated in the same manner, and have a previous strong coat of some kind of size ; but it is rarely made the subject of japanning till it is converted into *papier mache*, or wrought by other means, into such form, that its original state, particularly with respect to flexibility, is lost.

One principal variation in the manner of japanning is, the using or omitting any priming or under coat on the work to be japanned. In the older practice, such priming was always used ; and is at present retained in the French manner of japanning coaches and snuff-boxes of the *papier mache* : but in the Birmingham manufacture, it has been always rejected. The advantage of using such priming, or under coat, is, that it makes a saving in the quantity of varnish used ; because the matter of which the priming is composed, fills up the inequalities of the body to be varnished, and makes it easy by means of rubbing and water-polishing, to gain an even surface for the varnish. This was therefore such a convenience in the case of wood, as the giving a hardness and firmness to the ground was also in the case of leather, that it became an established method ; and is therefore retained, even in the instance of the *papier mache*, by the French, who applied the received method of japanning to that kind of work on its introduction. There

is, nevertheless, this inconvenience always attending the use of an under coat of size, that the japan coats of varnish and colour will be constantly liable to be cracked and peeled off by any violence, and will not endure near so long as the bodies jappanned in the same manner, but without any such priming. This may be easily observed in comparing the wear of the Paris and Birmingham snuff-boxes; which latter, when good of their kind, never peel or crack, or suffer any damage, unless by great violence, and such a continued rubbing as wastes away the substance of the varnish; while the japan coats of the Parisian boxes crack and fly off in flakes whenever any knock or fall, particularly near the edges, exposes them to be injured. But the Birmingham manufacturers, who originally practised the jappanning only on metals, to which the reason above given for the use of priming did not extend, and who took up this art of themselves as an invention, of course, omitted at first the use of any such under coat; and not finding it more necessary in the instance of *papier mache*, than on metals, continue still to reject it; on which account the boxes of their manufacture are, with regard to the wear, much better than the French.

The laying on the colours with varnish instead of gum-water, is also another variation from the method of jappanning formerly practised: but the much greater strength of the work, where they are laid on in varnish or oil, has occasioned this way to be exploded with the greatest reason by all regular manufacturers: however, they who may practise jappanning on cabinets, or such other pieces as are not exposed to much wear or violence, for their amusement only, and consequently may not find it worth their while to encumber themselves with the preparations necessary for the other methods, may paint with water-colours on an

under coat laid on the wood, or other substance, of which the piece to be japanned, is formed; and then finish with the proper coats of varnish, according to the methods below taught. If the colours are tempered with the strongest isinglass, size and honey, instead of gum-water, and laid on very flat and even, the work will not be much inferior in appearance to that done by the other method; and will last as long as the common old japan work, except the best kinds of the true japan.

It is practised likewise in imitation of what is sometimes done in the Indian work, to paint with water-colours on grounds of gold; in which case, the isinglass size, with sugar-candy, or honey, as above directed, is the best vehicle.

Imitations are also made of japan-work, by colouring prints, gluing them to wood work, and then giving them a shining appearance, by the use of some white varnish.

Of japan grounds.—The proper japan grounds are either such as are formed by the varnish and colour where the whole is to remain of one simple colour; or by the varnish, either coloured, or without colour, on which some painting, or other decoration, is afterwards to be laid. It is necessary, however, before I proceed, to speak of the particular grounds, to shew the manner of laying on the priming or under coat, where any such is used.

The priming is of the same nature with that called clear coating (or vulgarly clear coaling) practised erroneously by the house-painters; and consists only in laying on, and drying in the most even manner, a composition of size and whiting. The common size has been generally used for this purpose, but where the work is of a nicer kind, it is better to employ the gloves or the parchment size; and if a third of isinglass be added, it will be still better; and if

not laid on too thick, much less liable to peel and crack. The work should be prepared for this priming by being well smoothed with the fish-skin, or glass shaver; and being made thoroughly clean, should be brushed over once or twice with hot size, diluted with two thirds of water, if it be of the common strength. The priming should then be laid on with a brush as even as possible; and should be formed of a size, whose consistence is betwixt the common kind and glue, mixed with as much whiting as will give it a sufficient body of colour to hide the surface of whatever it is laid upon, but not more.

If the surface be very even on which the priming is used, two coats of it, laid on in this manner, will be sufficient; but if on trial, with a fine wet rag, it will not receive a proper water polish, on account of any inequalities not sufficiently filled up and covered, two or more coats must be given it: and whether a greater or less number be used, the work should be smoothed after the last coat but one is dry, by rubbing it with Dutch rushes. When the last coat is dry, the water polish should be given, by passing over every part of it with a fine rag, gently moistened, till the whole appear perfectly plain and even. The priming will then be completed, and the work ready to receive the painting, or coloured varnish: the rest of the proceedings are the same in this case as where no priming is used.

Of common grounds of varnish, which are to be painted upon. Where wood or leather is to be japanned, and no priming is used, the best preparation is to lay two or three coats of coarse varnish composed in the following manner:

“ Take of rectified spirit of wine, one pint; and of
“ coarse seed-lac and resin, each two ounces. Dissolve the
“ seed-lac and resin in the spirit; and then strain off the
“ varnish.”

This varnish, as well as all others formed of spirit of wine, must be laid on in a warm place; and, if it can be conveniently managed, the piece of work to be varnished, should be made warm likewise, and for the same reason all dampness should be avoided; for either cold or moisture chill this kind of varnish, and prevent its taking proper hold of the substance on which it is laid.

When the work is so prepared, or by the priming with the composition of size and whiting above described, the proper japan ground must be laid on, which is much the best formed of shell-lac varnish, and the colour desired; if white be not in question, which demands a peculiar treatment, as I shall below explain; or great brightness be not required, when all other means must be pursued.

The colours used with the shell-lac varnish may be any pigments whatever, which give the tint of the ground desired, and they may be mixed together to form browns or any compound colours; but, with respect to such as require peculiar methods for the producing them of the first degree of brightness, I shall particularize them below.

The colours for grounds may otherwise be mixed with the white varnishes formed in oil of turpentine; but these varnishes have no advantages over the shell-lac but in their whiteness, which preserves the brightness of the colours, and they are at the same time greatly inferior in hardness to it.

As metals never require to be under coated with whiting, they may be treated in the same manner as wood or leather, when the under coat is omitted, except in the instances particularly spoken of below.

Of white japan grounds.—The forming a ground perfectly white, and of the first degree of hardness, remains

hitherto a *desideratum*, or matter sought for in the art of japanning. As there are no substances which can be dissolved so as to form a very hard varnish, but what have too much colour not to deprive the whiteness when laid on of a due thickness over the work, except some very late discoveries not hitherto brought into practice.

The nearest approach, however, to a perfect white varnish, by means already known to the public, is made by the following composition:

“ Take flake white, or white lead, washed over and ground up with a sixth of its weight of starch, and then dried, and temper it properly for spreading with mastic varnish, or compound them with gum animi.” Lay these on the body to be japanned, prepared either with or without the under coat of whitening in the manner as above ordered, and then varnish over it with five or six coats of the following varnish:

“ Provide any quantity of the best seed-lac, and pick out of it all the clearest and whitest grains, reserving the more coloured and fouler parts for the coarser varnishes, such as that above-mentioned for priming or preparing wood or leather. Take of this picked seed-lac, two ounces; and of gum animi, three ounces; and dissolve them, being previously reduced to a gross powder, in about a quart of spirit of wine, and strain off the clear varnish.”

The seed-lac will yet give a slight tinge to this composition, but cannot be omitted, where the varnish is wanted to be hard; though, where a softer will answer the end, the proportion may be diminished; and a little crude turpentine added to the gum animi, to take off the brittleness.

A very good varnish, free entirely from all brittleness, may be formed, by dissolving as much gum animi, as the

oil will take, in old nut or poppy oil, which must be made to boil gently when the gum is put into it. The ground of white colour itself may be laid on in this varnish, and then a coat or two of it may be put over the ground; but it must be well diluted with oil of turpentine when it is used: this, though free from brittleness, is, nevertheless, liable to suffer, by being indented or bruised by any slight strokes; and it will not bear any polish, but may be brought to a very smooth surface without, if it be judiciously managed in the laying it on. It is likewise somewhat tedious in drying, and will require some time where several coats are laid on, as the last ought not to contain much oil of turpentine. It must be observed, likewise, that the gum resin, such as the animi, copal, &c. can never be dissolved in substantial oils by the medium of heat, without a considerable change in the colour of the oils by the degree of heat necessary to produce the solution. A method of dissolving gum copal in oil of turpentine is, however, now discovered by a gentleman of great abilities in chemistry: and he has also obtained a method of dissolving amber in the same menstruum, so that we may hope soon to see the art of japanning carried to a consummate degree of perfection; when the public are put in possession of these most important inventions, or the fruits of them.

Of blue japan grounds.—Blue japan grounds may be formed of bright Prussian blue, or of verditer glazed over by Prussian blue, or of smalt. The colour may be best mixed with shell-lac varnish, and brought to a polishing state by five or six coats of varnish of seed-lac: but the varnish, nevertheless, will somewhat injure the colour, by giving to a true blue a cast of green, and fouling, in some degree, a warm blue, by the yellow it contains: where, therefore, a bright blue is required, and a less degree of hardness can

be dispensed with, the method before directed, in the case of white grounds, must be pursued.

Of red japan grounds.—For a scarlet japan ground, vermillion may be used: but the vermillion alone has a glaring effect that renders it much less beautiful than the crimson produced by glazing it over with carmine or fine lake; or even with rose pink, which has a very good effect used for this purpose; for a very bright crimson, nevertheless, instead of glazing with carmine, the Indian lake, known in shops by the name of safflower, should be used, dissolved in the spirit of which the varnish is compounded (which it readily admits of when good): but in this case, instead of glazing with the shell-lac varnish, the upper or polishing coats need only be used, as they will equally receive and convey the tinge of the Indian lake, which may be actually dissolved by spirit of wine; and this will be found a much cheaper method than using carmine. If, notwithstanding, the highest degree of brightness be required, the white varnishes must be used.

It is at present, however, very difficult to obtain this kind of lake; for it does not appear that more than one considerable quantity was ever brought over, and put into the hands of colourmen; and this being now expended, they have not the means of a fresh supply: it, however, may be easily had from the same place whence the former quantity was procured, by any persons who go thither in the East India company's ships.

Of yellow japan grounds.—For bright yellow grounds, king's yellow, or turpeth mineral, should be employed, either alone, or mixed with fine Dutch pink. The effect may be still more heightened by dissolving powdered turmeric root in the spirit of wine, of which the upper, or polishing coat is made; which spirit of wine must be strained

from off the dregs before the seed-lac be added to it to form the varnish.

The seed-lac varnish is not equally injurious here, and with greens, as in the case of other colours; because, being only tinged with a reddish yellow, it is little more than an addition to the force of the colours.

Yellow grounds may be likewise formed of the Dutch pink only; which, when good, will not be wanting in brightness, though extremely cheap.

Of green japan grounds.—Green grounds may be produced by mixing king's yellow and bright Prussian blue; or rather, turpeth mineral and Prussian blue. A cheap, but fouler kind, may be had from verdigrise, with a little of the above-mentioned yellows, or Dutch pink: but where a very bright green is wanted, the chrystals of verdigrise (called distilled verdigrise) should be employed; and, to heighten the effect, they should be laid on a ground of leaf gold, which renders the colour extremely brilliant and pleasing.

They may, any of them, be used successfully with good seed-lac varnish, for the reason before given; but will be still brighter with the white varnish.

Of orange-coloured japan grounds.—Orange-colour japan grounds may be formed, by mixing vermilion, or red lead, with king's yellow, or Dutch pink; or red orpiment will make a brighter orange ground than can be produced by any mixture.

Of purple japan grounds.—Purple japan grounds may be produced by the mixture of lake and Prussian blue; or a fouler kind, by vermilion and Prussian blue. They may be treated as the rest, with respect to the varnish.

Of black japan grounds, to be produced without heat.—Black grounds may be formed by either ivory black, or

lamp black ; but the former is preferable, where it is perfectly good.

These may be always laid on with the shell-lac varnish ; and have their upper or polishing coats of common seed-lac varnish ; as the tinge or foulness of the varnish can be here no injury.

Of common black japan grounds on iron or copper, produced by means of heat.—For forming the common black japan grounds by means of heat, the piece of work to be japanned must be painted over with drying oil ; and, when it is of a moderate dryness, must be put into a stove of such degree of heat, as will change the oil black, without burning it, so as to destroy or weaken its tenacity. The stove should not be too hot when the work is put into it, nor the heat increased too fast ; either of which errors would make it blister ; but the slower the heat is augmented, and the longer it is continued, provided it be restrained within the due degree, the harder will be the coat of japan. This kind of varnish requires no polish, having received, when properly managed, a sufficient one from the heat.

Of the fine tortoise-shell japan ground, produced by means of heat.—The best kind of tortoise-shell ground produced by heat is not less valuable for its great hardness, and enduring to be made hotter than boiling water without damage, than for its beautiful appearance. It is to be made by means of a varnish prepared in the following manner :

“ Take of good linseed oil one gallon, and of umbre
“ half a pound. Boil them together till the oil becomes
“ very brown and thick ; strain it then through a coarse
“ cloth, and set it again to boil ; in which state it must be
“ continued till it acquires a pitchy consistence, when it
“ will be fit for use.”

Having prepared thus the varnish, clean well the iron or copper-plate, or rather piece which is to be japanned; and then lay vermillion, tempered with shell-lac varnish, or with drying oil, diluted with oil of turpentine, very thinly, on the places intended to imitate the more transparent parts of the tortoise-shell. When the vermillion is dry, brush over the whole with the black varnish, tempered to a due consistence with oil of turpentine; and when it is set and firm, put the work into a stove, where it may undergo a very strong heat, and it must be continued a considerable time; if even three weeks, or a month, it will be the better.

This was given, among other recipes, by Kunckel, but appears to have been neglected till it was revived with great success, in the Birmingham manufactures, where it was not only the ground of snuff-boxes, dressing-boxes, and other such like lesser pieces, but of those beautiful tea-waiters which have been so justly esteemed and admired in several parts of Europe where they have been sent. This ground may be decorated with painting and gilding in the same manner as any other varnished surface, which had best be done after the ground has been duly hardened by the hot stove; but it is well to give a second annealing with a more gentle heat after it is finished.

Of painting japan work.—Japan work ought properly to be painted with colours in varnish: but in order for the greater dispatch, and in some very nice works in small, for the more free use of the pencil, the colours are now most frequently tempered in oil, which should previously have a fourth part of its weight of gum animi dissolved in it; or, in default of that, of the gum sandarac or mastic, as I have likewise before intimated. When the oil is thus used, it

should be well diluted with spirit of turpentine, that the colours may be laid more evenly and thin; by which means, fewer of the polishing, or upper coats of varnish, become necessary.

In some instances, water-colours, as I before mentioned, are laid on grounds of gold, in the manner of other paintings; and are best, when so used, in their proper appearance, without any varnish over them; they are also sometimes so managed as to have the effect of embossed work. The colours employed in this way, for painting, are (as I before intimated) best prepared by means of isinglass size, corrected with honey or sugar-candy. The body on which the embossed work is raised, need not, however, be tinged with the exterior colour, but may be best formed of very strong gum-water, thickened to a proper consistence by bole armoniac and whiting in equal parts, which being laid on in the proper figure, and repaired when dry, may be then painted with the proper colours, tempered in the isinglass size, or in the general manner with shell-lac varnish.

Of varnishing japan work.—The last, and finishing part of jappanning lies in the laying on, and polishing the outer coats of varnish, which are necessary, as well in the pieces that have only one simple ground of colour, as with those that are painted. This is, in general, best done with common seed-lac varnish, except in the instances, and on those occasions where I have already shewn other methods to be more expedient. The same reasons, which decide as to the fitness or impropriety of the varnishes, with respect to the colours of the ground, hold equally well with regard to those of the painting; for, where brightness is the most material point, and a tinge of yellow will injure it, seed-lac must give way to the whiter gums: but where hardness

and a greater tenacity are most essential, it must be adhered to; and where both are so necessary, that it is proper one should give way to the other, in a certain degree, reciprocally, a mixed varnish must be adopted.

This mixed varnish, as I before observed, should be made of the picked seed-lac. The common seed-lac varnish, which is the most useful preparation of the kind hitherto invented, may be thus made:

“ Take of seed-lac three ounces, and put it into water
“ to free it from the sticks and filth that frequently are
“ intermixed with it, and which must be done by stirring
“ it about, and then pouring off the water, and adding
“ fresh quantities in order to repeat the operations till it be
“ free from all impurities, as it very effectually may be by
“ this means. Dry it then, and powder it grossly; put it,
“ with a pint of rectified spirit of wine, into a bottle, of
“ which it will not fill above two thirds. Shake the mixture
“ well together, and place the bottle in a gentle heat
“ till the seed appears to be dissolved; the shaking being
“ in the mean time repeated as often as may be convenient;
“ and then pour off all which can be obtained clear by that
“ method, and strain the remainder through a coarse cloth.
“ The varnish thus prepared, must be kept for use in a
“ bottle well stopped.”

When the spirit of wine is very strong, it will dissolve a greater proportion of the seed-lac; but this will saturate the common, which is seldom of a strength sufficient for making varnishes in perfection. As the chilling, which is the most inconvenient accident attending those of this kind, is prevented, or produced more frequently, according to the strength of the spirit, I will take this opportunity of shewing a method by which weaker rectified

spirits may, with great ease, at any time, be freed from the phlegm, and rendered of the first degree of strength.

“ Take a pint of the common rectified spirit of wine;
 “ and put it into a bottle, of which it will not fill above
 “ three parts. Add to it half an ounce of pearl-ashes, salt
 “ of tartar, or any other alkaline salt, heated red hot, and
 “ powdered, as well as it can be, without much loss of its
 “ heat. Shake the mixture frequently for the space of half
 “ an hour; before which time, a great part of the phlegm
 “ will be separated from the spirit; and will appear, toge-
 “ ther with the undissolved part of the salts, in the bottom
 “ of the bottle. Let the spirit then be poured off, or freed
 “ from the phlegm and salts by means of a tritorium, or
 “ separating funnel, and let half an ounce of the pearl-
 “ ashes, heated and powdered as before, be added to it;
 “ and the same treatment repeated. This may be done a
 “ third time, if the quantity of phlegm separated by the
 “ addition of the pearl-ashes appears considerable. An
 “ ounce of alum reduced to powder, and made hot, but
 “ not burnt, must then be put into the spirit, and suffered
 “ to remain some hours; the bottle being frequently
 “ shaken: after which, the spirit being poured off, it will
 “ be fit for use.”

The addition of the alum is necessary to neutralize the remains of the alkaline salts, or pearl-ashes, which would otherwise greatly deplete the spirit with respect to varnishes and lacquers, where vegetable colours are concerned, and must consequently render another distillation necessary.

The manner of using the seed-lac, or white varnishes, is the same, except with regard to the substance used in polishing, which, where a pure white, or great clearness

of other colours, is in question, should be itself white; whereas, the browner sorts of polishing dust, as being cheaper, and doing their business with greater dispatch, may be used in other cases. The pieces, or work to be varnished, should be placed near a fire, or in a room where there is a stove, and made perfectly dry; and then the varnish may be rubbed over them by the proper brushes made for that purpose, beginning in the middle, and passing the brush to one end; and then, with another stroke from the middle, passing it to the other: but no part should be crossed, or twice passed over, in forming one coat, where it can possibly be avoided. When one coat is dry, another must be laid over it; and this must be continued at least five or six times, or more, if on trial, there be not a sufficient thickness of varnish to bear the polish, without laying bare the painting, or the ground colour underneath.

When a sufficient number of coats is thus laid on, the work is fit to be polished, which must be done, in common cases, by rubbing it with a rag dipped in tripoli (commonly called rotten-stone) finely powdered: but towards the end of the rubbing, a little oil of any kind should be used along with the powder; and when the work appears sufficiently bright and glossy, it should be well rubbed with the oil alone, to clean it from the powder, and give it a still brighter lustre.

In the case of white grounds, instead of the tripoli, fine putty or whiting must be used; both which should be washed over to prevent the danger of damaging the work from any sand or other gritty matter, that may happen to be commixed with them.

It is a great improvement of all kinds of japan work, to harden the varnish by means of heat; which, in every degree that can be applied short of what would burn or

calcine the matter, tends to give it a more firm and strong texture. Where metals form the body, therefore, a very hot stove may be used, and the pieces of work may be continued in it a considerable time, especially if the heat be gradually increased: but where wood is in question, heat must be sparingly used, as it would otherwise warp or shrink the body, so as to injure the general figure.

Of gilding japan work.—The various methods of gilding, which are applicable to the ornamenting japan work, being exceedingly prolix and uninteresting, it is needless to repeat them here: I shall, therefore, only observe, that in gilding with gold size (which is almost the only method now practised in japan work) where it is desired to have the gold not shine, or approach in the least towards the burnishing state, the size should be used either with oil of turpentine only, or with a very little fat oil: but where a greater lustre and appearance of polish are wanting, without the trouble of burnishing, and the preparation necessary for it, fat oil alone, or mixed with a little gold size, should be used; and the same proportionable effect will be produced from a mean proportion of them.



Of LACQUERING.

LACQUERING is the laying either coloured or transparent varnishes on metals, in order to produce the appearance of a different colour in the metal, or to preserve it from rust and the injuries of the weather.

Lacquering is therefore much of the same nature with japanning, both with regard to the principles and practice;

except that no opaque colours, but transparent tinges alone, are to be employed.

The occasions on which lacquering is now in general used are three: Where brass is to be made to have the appearance of being gilt; where tin is wanted to have the resemblance of yellow metals; and where brass or copper locks, nails, or other such matters, are to be defended from the corrosion of the air or moisture. There was, indeed, formerly another very frequent application of lacquering, which was colouring frames of pictures, &c. previously silvered, in order to give them the effect of gilding, but this is now mostly disused. These various intentions of lacquering require different compositions for the effectuating each kind; and, as there is a multiplicity of ingredients which may be conducive to each purpose, a proportionable number of *recipes* have been devised and introduced into practice, especially for the lacquering brass work to imitate gilding, which is a considerable object in this kind of art, and has been improved to the greatest degree of perfection. I shall, however, only give one or two *recipes* for each, as they are all which are necessary; the others being made too complex by ingredients not essential to the intention, or too costly by the use of such as are expensive; or inferior in goodness from the improper choice or proportion of the component substances.

The principal body or matter of all good lacquers used at present is seed-lac; but, for coarser uses, resin, or turpentine, is added, in order to make the lacquer cheaper than if the seed-lac, which is a much dearer article, be used alone. Spirit of wine is also consequently the fluid or menstruum of which lacquers are formed; as the ethereal oils will not dissolve the seed-lac, and it is proper that the spirit should be highly rectified for this purpose. As it is seldom prac-

licable, nevertheless, to procure such spirits from the shops, it will be found very advantageous to use the method above given for dephlegmating it by alkaline salts; but the use of the alum, directed in that process, must not be forgotten on this occasion; as the effect of the alkaline salt would otherwise be the turning the metal of a purplish, instead of a golden colour, by laying on the lacquer.

The following are excellent compositions for brass work which is to resemble gilding:

“ Take of turmeric ground, as it may be had at the dry-
 “ salters, one ounce, and of saffron and Spanish annatto,
 “ each two drams. Put them into a proper bottle, with a
 “ pint of highly rectified spirit of wine, and place them in
 “ a moderate heat, if convenient, often shaking them for
 “ several days. A very strong yellow tincture will then be
 “ obtained, which must be strained off from the dregs
 “ through a coarse linen cloth; and then, being put back
 “ into the bottle, three ounces of good seed-lac, powdered
 “ grossly, must be added, and the mixture placed again in
 “ a moderate heat, and shaken, till the seed-lac be dissolved;
 “ or at least such part of it as may. The lacquer must
 “ then be strained as before, and will be fit for use; but
 “ must be kept in a bottle carefully stopped.”

Where it is desired to have the lacquer warmer or redder than this composition may prove, the proportion of the annatto must be increased; and where it is wanted cooler, or nearer a true yellow, it must be diminished.

The above, properly managed, is an extremely good lacquer, and of moderate price; but the following, which is cheaper, and may be made where the Spanish annatto cannot be procured good, is not greatly inferior to it.

“ Take of turmeric root ground, one ounce, of
 “ the best dragon's blood half a dram. Put them in a

"a pint of spirit of wine, and proceed as with the above."

By diminishing the proportion of the dragon's blood, the varnish may be rendered of a redder, or truer yellow cast.

Saffron is sometimes used to form the body of colour in this kind of lacquer, instead of the turmeric; but though it makes a warmer yellow, yet the dearthness of it, and the advantage which turmeric has in forming a much stronger tinge in spirit of wine, not only than the saffron, but than any other vegetable matter hitherto known, gives it the preference; though being a true yellow, and consequently not sufficiently warm to overcome the greenish cast of brass, it requires the addition of some orange-coloured tinge to make a perfect lacquer for this purpose.

Aloes and gamboge are also sometimes used in lacquers, for brass; but the aloes is not necessary where turmeric or saffron are used; and the gamboge, though a very strong milky yellow in water, affords only a very weak tinge in spirit of wine.

The varnish for tin may be made as follows: "Take of turmeric root, one ounce; of dragon's blood, two drams; and of spirit of wine, one pint. Proceed as in the former."

This may, like the former, have the red or yellow rendered more prevalent, by the increasing or diminishing the proportion of the dragon's blood. Where a coarser, or cheaper kind is wanted, the quantity of feed-lac may be abated; and the deficiency thence arising supplied by the same proportion of resin.

The lacquer for locks, nails, &c. where little or no colour is desired, may either be feed-lac varnish alone, as prepared above, or with a little dragon's blood; or a com-

pound varnish of equal parts of seed-lac and resin, with or without the dragon's blood.

The manner of laying on the lacquer is as follows :

First, let the pieces of work to be lacquered be made thoroughly clean ; which, if they be new founded, must be done by means of *aqua fortis*. Being ready, they must be heated by a small charcoal fire, in a proper vessel, or any way that may be most convenient ; the degree must not be greater than will admit of their being taken hold of without burning the hand. The lacquer must then be laid on by a proper brush in the manner of other varnishes ; and the pieces immediately set again in the same warm situation. After the lacquer is thoroughly dry and firm, the same operation must be renewed again for four or five times, or till the work appear of the colour and brightness intended. For very fine work, some use a less proportion of seed-lac, which occasions the lacquer to lie more even on the metal ; but, in this case, a greater number of coats are required, which multiplies the proportion of labour ; though where the price of the work will allow for such additional trouble, it will be the more perfect for it.

The lacquering tin may be performed in the same manner as is here directed for brass, but being for coarser purposes, less nicety is observed ; and fewer coats (or perhaps one only) are made to suffice, as the lacquer is compounded so very red ; that the tinge may have the stronger effect.

Locks, nails, &c. where lacquer is only used in a defensive view to keep them from corroding, and not for the improvement of the colour, may be treated in the same manner ; but one or two coats are generally thought sufficient ; though, where any regard is had to the wear, the coats of lacquer or varnish should always be of a due thick-

ness, when they are to be exposed to the air; otherwise, the first moist weather makes them chill, and look gray and misty, in such a manner, that they are rather injurious than beneficial to the work they are laid upon.

The lacquering picture-frames, &c. where the ground is leaf-silver, may be performed in the same manner as hereafter directed in the case of gilding leather: the circumstances being nearly the same, except with relation to the texture of the subject; to suit which, the different manner of treatment may be easily adapted: but the lacquer, as was before observed, may be the same.

Of STAINING WOOD.

To stain yellow.

TAKE any white wood, and brush it over several times with the tincture of turmeric root, made by putting an ounce of the turmeric ground to powder, to a pint of spirit; and, after they have stood some days, straining off the tincture. If the yellow colour be desired to have a redder cast, a little dragon's blood must be added, in the proportion that will produce the tint required.

A cheaper, but least strong and bright yellow, may be given to wood, by rubbing it over several times with the tincture of the French berries, prepared as in p. 56, and made boiling hot. After the wood is again dry, it should be brushed over with a weak alum water, used cold.

Smaller pieces of wood, instead of being brushed over with them, may be soaked in the decoctions or tinctures.

Wood may be also stained yellow by means of *aqua fortis*, which will sometimes produce a very beautiful yellow colour; but at other times a browner. The wood should be warm when the *aqua fortis* is not too strong, and that it be sparingly used; otherwise a brown, sometimes even a blackish colour may be the result.

In order to render any of these stains more beautiful and durable, the wood should be brushed after it is coloured, and then varnished by the seed-lac varnish; or, when desired to be very strong, and to take a high polish, with three or four coats of shell-lac varnish.

Of staining wood red.—For a bright red stain for wood, make a strong infusion of brasil in stale urine, or water impregnated with pearl-ashes, in the proportion of an ounce to a gallon; to a gallon of either of which, the proportion of Brasil wood must be a pound, which being put to them, they must stand together two or three days, often stirring the mixture. With this infusion strained, and made boiling hot, brush over the wood to be stained, till it appears strongly coloured; then, while yet wet, brush it over with alum-water made in the proportion of two ounces of alum to a quart of water.

For a less bright red, dissolve an ounce of dragon's blood in a pint of spirit of wine, and brush over the wood with the tincture till the stain appears to be as strong as is desired: but this is, in fact, rather lacquering than staining.

For a pink, or rose red, add to a gallon of the above infusion of Brasil wood, two additional ounces of the pearl-ashes, and use it as it was before directed; but it is necessary, in this case, to brush the wood over often with alum water. By increasing the proportion of pearl-ashes, the red may be rendered yet paler; but it is proper, when

more than this quantity is added, to make the alum-water stronger.

These reds, when it is necessary, may be varnished as the yellows.

Of staining wood blue.—Wood may be stained blue, by means either of copper or indigo; but the first will afford a brighter colour, and is more generally practicable than the latter; because the indigo can be used only in that state to which it is brought by the manner of preparation used by the dyers, of whom indeed it must be had, as it cannot be properly so prepared but in large quantities, and with a particular apparatus. The method of staining blue with the copper is as follows:

“Take a solution of copper, made according to the directions in p. 49, and brush it, while hot, several times over the wood. Then make a solution of pearl-ashes, in the proportion of two ounces to a pint of water, and brush it hot over the wood stained with the solution of copper, till it be of a perfectly blue colour.”

Wood stained green as above by verdigrise, may likewise be made blue, by using the solution of the pearl-ashes in the same manner.

When indigo is used for staining wood blue, it must be managed thus:

“Take indigo prepared with soap-lees, as when used by the dyers, and brush the wood with it boiling hot. Prepare then a solution of white tartar, or cream of tartar, which is to be made by boiling three ounces of the tartar, or cream, in a quart of water; and with this solution, used copiously, brush over the wood before the moisture of the tincture of indigo be quite dried out of it.”

These blues may be brushed and varnished as the reds where there is occasion.

Of staining wood of mahogany colour. — Mahogany colour is the most useful of any stain for wood (especially since veneering with different colours is out of fashion) as it is much practised at present for chairs and other furniture, made in imitation of mahogany; which, when well managed, may be brought to have a very near resemblance.

This stain may be of different hues, as the natural wood varies greatly, being of all the intermediate tints between the red, brown, and purple brown, according to the age, or sometimes the original nature of different pieces.

For the light red brown, use a decoction of madder and fustic wood, ground in water; the proportion may be half a pound of madder, and a quarter of a pound of fustic, to a gallon; or, in default of fustic, an ounce of the yellow berries may be used. This must be brushed over the wood to be stained, while boiling hot, till the due colour be obtained; and, if the wood be kindly grained, it will have greatly the appearance of new mahogany.

The same effect nearly may be produced by the tincture of dragon's blood and turmeric root, in spirit of wine, by increasing or diminishing the proportion of each, of which ingredients the brown stain may be varied to a more red or yellow cast at pleasure. This succeeds better upon wood, which has already some tinge of brown, than upon whiter.

For the dark mahogany, take the infusion of madder made as above, except the exchanging the fustic for two ounces of logwood; and when the wood to be stained has been several times brushed over, and is again dry, it must

be slightly brushed over with water in which pearl-ashes have been dissolved, in the proportion of about a quarter of an ounce to a quart.

Any stains of the intermediate colours may be made by mixing these ingredients, or varying the proportion of them.

Where these stains are used for better kind of work, the wood should be afterwards varnished with three or four coats of seed-lac varnish; but for coarse work, the varnish of resin and seed-lac may be employed, or they may be only well rubbed over with drying oil.

Of staining wood green.—Dissolve verdigrise in vinegar, or crystals of verdigrise in water; and with the hot solution, brush over the wood till it be duly stained. This may be brushed and varnished as above.

Of staining wood purple.—Brush the wood to be stained several times with a strong decoction of logwood and Brasil, made in the proportion of one pound of the logwood, and a quarter of a pound of the Brasil to a gallon of water, and boiled for an hour or more. When the wood has been brushed over till there be a sufficient body of colour, let it dry, and then be slightly passed over by a solution of one dram of pearl-ashes in a quart of water. This solution must be carefully used, as it will gradually change the colour from a brown red, which it will be originally found to be, to a dark blue purple; and therefore its effect must be restrained to the due point for producing the colour desired. This may be varnished as the rest.

Of staining wood black.—Brush the wood several times with the hot decoction of logwood made as above, but without the Brasil: then, having prepared an infusion of galls, by putting a quarter of a pound of powdered galls to two quarts of water, and setting them in the sun-shine, or

any other gentle heat, for three or four days, brush the wood three or four times over with it, and then pass over it it again, while yet wet, with a solution of green vitriol in water, in the proportion of two ounces to a quart.

The above is the cheapest method; but a very fine black may be produced by brushing the wood several times over with a solution of copper in *aqua fortis*, and afterwards with the decoction of logwood, which must be repeated till the colour be of sufficient force; and the greenness produced by the solution of the copper, wholly overcome. These blacks may be varnished as the other colours.

Where the stains are desired to be very strong, as in the case of wood intended to be used for veneering, it is in general necessary they should be soaked, and not brushed, to render which the more practicable, the wood may be previously slit, or sawed into pieces of a proper thickness for inlaying.

It is to be understood also, that when the wood is above ordered to be brushed several times over with the tinging substances, it should be suffered to dry after each brushing.

Of staining ivory, bone, or horn, yellow.—Boil them first in a solution of alum, in the proportion of one pound to two quarts of water, and then prepare a tincture of the French berries, by boiling half a pound of the berries, pounded, in a gallon of water, with a quarter of a pound of pearl-ashes. After this tincture has boiled about an hour, put the ivory, &c. previously boiled in the alum-water, into it, and let them remain there half an hour.

If turmeric root be used, instead of the French berries, a brighter yellow may be obtained; but the ivory, &c. must, in that case, be again dipped in alum-water, after it is taken out of the tincture, otherwise an orange colour,

not a yellow, will be produced from the effect of the pearl-ashes on the turmeric.

Of staining ivory, bone, and horn, green.—They must be boiled in a solution of verdigrise in vinegar, or of copper in aquafortis, prepared as above directed (a vessel of glass or earthenware being employed for this purpose) till they are of the colour desired.

Of staining ivory, bone, and horn, red.—Take strong lime-water prepared as for other purposes, and the raspings of Brasil wood, in the proportion of half a pound to a gallon. Let them boil for an hour, and then put in the ivory, &c. prepared by boiling in alum-water in the manner above directed for the yellow, and continue it there till it be sufficiently coloured. If it be too crimson, or verge toward the purple, it may be rendered more scarlet by dipping again in the alum-water.

Of staining ivory, bone, and horn, blue.—Stain the ivory, &c. first green, according to the manner above directed; and then dip it in a solution of pearl-ashes made strong, and boiling hot; but it must not be continued longer, nor dipped oftener, than is necessary to convert the green to blue.

The ivory, &c. may otherwise be boiled in the tincture of indigo, prepared as by the dyers, and afterwards in the solution of tartar, made as is directed for the staining wood.

Of staining ivory, bone, and horn, purple.—Treat them in the same manner as was directed for red, except that logwood must be substituted in the place of Brasil wood, and the use of the alum-water must be omitted wholly.

If a redder purple be wanted, a mixture of the logwood and Brasil must be employed, instead of the logwood alone.

The proportion may be equal parts; or any less proportion of the Brasil, according to the colour desired.

Of staining horn to imitate tortoise-shell.—The horn to be stained must be first pressed into proper plates, or scales, or other flat form. The following mixture must then be prepared:

“ Take of quick-lime, two parts; and of litharge one, and temper them to the consistence of a soft paste with soap-lye.”

Put this paste over all the parts of the horn, except such as are proper to be left transparent in order to the greater resemblance of the tortoise-shell. The horn must then remain thus covered with the paste till it be thoroughly dry; when the paste being brushed off, the horn will be found partly opaque, and partly transparent, in the manner of tortoise-shell; and when put over a foil, of the kind of latten, called *affidue*, will be scarcely distinguishable from it. It requires some degree of fancy and judgment to dispose of the paste in such a manner as to form a variety of transparent parts of different magnitude and figure, to look like the effect of nature; and it will be an improvement to add semi-transparent parts. This may be done by mixing whiting with some of the paste to weaken its operation in particular places, by which spots of a reddish brown will be produced; that, if properly interspersed, especially on the edges of the dark parts, will greatly increase as well the beauty of the work, as its similitude with the real tortoise-shell.

To stain ivory, bone, and horn, black.—Proceed in the same manner as is before directed for wood.

Of staining paper, or parchment, yellow.—Paper may be stained yellow by the tincture of French berries, prepared

as in p. 52, but a much more beautiful colour may be obtained by using the tincture of turmeric formed by infusing an ounce or more of the root, powdered, in a pint of spirit of wine. This may be made to give any tint of yellow, from the lightest straw to the full colour, called, French yellow; and will be equal in brightness even to the best dyed silks. If yellow be wanted of a warmer or redder cast, annatto, or dragon's blood, must be added to the tincture.

The best manner of using these, and the following tinctures, is to spread them even on the paper or parchment, by means of a broad brush, in the manner of varnishing.

Of staining paper, or parchment, red.—Paper or parchment may be stained red, by treating it in the same manner as is directed for wood, p. 216, or by red ink. It may also be stained of a scarlet hue by the tincture of dragon's blood in spirit of wine; but this will not be bright.

A very fine crimson stain may be given to paper, by a tincture of Indian lake, which may be, by infusing the lake some days in spirit of wine; and then pouring off the tincture from the dregs.

Of staining paper, or parchment, green.—Paper, or parchment, may be stained green by the solution of verdigrise in vinegar; or by the chrystals of verdigrise dissolved in water: as also by the solution of copper in *aqua fortis* made by adding filings of copper gradually to the *aqua fortis* till no ebullition ensues; or spirit of salt may be used in the place of the *aqua fortis*.

Of staining paper, or parchment, blue.—A blue colour may be given to paper or parchment, by staining it green by any of the abovementioned methods; and treating it afterwards as is directed for staining wood blue; by the

same means; or by indigo, in the manner there explained likewise.

Of staining paper, or parchment, orange.—Stain the paper, or parchment, first of a full yellow, by means of the tincture of turmeric, as before directed. Then brush it over with a solution of fixed alkaline salt, made by dissolving half an ounce of pearl-ashes, or salt of tartar, in a quart of water, and filtering the solution.

Of staining paper, or parchment, purple.—Paper, or parchment, may be stained purple by archal; or by the tincture of logwood, according to the method above directed for staining wood. The juice of ripe privet berries expressed, will likewise give a purple dye to paper or parchment.

Of staining alabaster, marble and other stones, of various colours.—Alabaster, marble and other stones, may be stained of a yellow, red, green, blue, purple, black, or any of the compound colours, by the means given for staining wood: but it is better if a strong tinge is wanted, to pour the tincture, if made in water, boiling hot on the alabaster, &c. spreading it equally on every part, than to brush it over only; though that may be sufficient where a slight dye will suffice.

When tinctures in spirit of wine are used, they must not be heated, as the spirit would evaporate, and leave the tinging gums in an undissolved state.

Where stones are not perfectly white, but partake of brownness, or greyness, the colour produced by the tinges will be proportionably wanting in brightness: because the natural colour of the stone is not hid or covered by these tinges, but combines with them; and, for the same reason, if the stones be of any of the pure colours, the result will be a compound of such colour, and that of the tinge.

Of CASTING.

To prepare clay in such a manner as to be fit to make all manner of moulds to cast gold, silver, and other metals in.

TAKE as much clay as you will, put it into an earthen pot that is glazed, and cover and lute it very close; then put it into a potter's furnace, and let it stand as long as other earthen-ware. After it is burned and cold, grind the clay upon a colour-stone, very fine, sift it through a fine hair sieve into clear water; and, after it is settled, pour off the water, and grind the clay once more upon the stone, as fine as possible; then wash it again in fair water as before, and set it in the sun, or in a warm place, to dry.

After this burned and washed clay is thoroughly dry, take thereof three pounds, sal-armoniac two pounds, tartar two pounds, and vitriol one pound; mix them together, and put this mixture into one or two pots; pour upon it about seven quarts of clean water, and boil this composition for some time; then take this water, whilst it is warm, and mix your burned clay therewith, to such a consistence, that you may form it into balls: lay these in a warm place to dry; and, when dry, put them into an earthen pot as before, and give them another baking among the earthen-ware; and, when cold, grind them fine, and that powder will be fit for use.

The clay being thus prepared, take sal-armoniac, put it into a glass, with water, that holds about two quarts; put so much of the sal-armoniac to the water as will dissolve it

over a gentle warmth, and let it stand one or two hours closed up; then take your powder of clay, temper it with this water to such a consistence as to form it into balls, and make what moulds you please thereof. When you cast your metal, you must make your mould red hot, and be also very nimble in pouring out your melted metal.

To make moulds of clay to cast brass or other metals therein:—Take good clear clay, such as the pewterers' use; take also cloth shaving, or fine short plucked cotton, and fine clear sand; and if the sand is not fine enough, grind it on a colour stone; mix this with the clay to such a consistence as is fit to make or form your moulds thereof. Your clay must not be made soft with water, but with strong beer; and, when you cast, let your mould be red hot.

If you would have a fine, and sharp cast, sift over your clay some fine washed ashes before you make the impression.

To prepare moulds which need not to be heated for casting metal in them:—Take fine sand, such as the goldsmiths' use; mix it with lamp-black, as much as you think proper; then temper it with rape or linseed oil fit to make your moulds thereof; whatever you cast in them comes not only out neat and sharp, but you have no occasion to heat your mould, as is required in other cases: this you must observe, that your sand be very dry, before you temper it with the oil.

The preparation of Mantua earth for moulds:—Take Mantua earth one part, and one part of charcoal dust of burnt birch, and one part of salt; then mix with it an equal quantity of tartar; boil up the mixture together in a copper pan, and let it seeth three times; with this water, which keeps always good, moisten and temper your earth so as to form it into balls between your hands, and when you would make your mould, roll your earth with a roller till

it is smooth and pliable, then you may form it into what fashion you please. In this mould you may cast before it is dried; and when you have cast, take off the earth which is dried through the heat of the metal; grind the same again, and temper it as you did at first to use it again.

A particular sort of mould in which one may cast exceedingly fine:—Take horse muscles, or for want of them oyster shells; let them be calcined in a potter's furnace; then pulverize and temper them with urine; of this make your moulds, and you will cast very fine and sharp.

To impress bas-relievo or medals, in imitation of ivory:—Take of prepared clay one pound, fine plaister of Paris eight ounces, white starch eight ounces; mix these together, and beat up the mixture with the white of six or eight eggs; put to it three ounces of clear gum arabac; stir it well together to a paste, and put so much of the dry mixture to it till you knead it like dough; then press it into a mould with the palm of your hand, and let it dry in the sun, observing to lay the paste side on a smooth board, and it will be clear and hard like ivory. You may impress all manner of medals and curiosities, and make them of what colour you please.

To impress medals and other things in brass-relievo, on paper:—Take the shavings of superfine white paper, and steep them in fair water for six or eight days; then put them into a clean earthen pot with water, and boil them for two or three hours; this done, take them out of the pot with as little moisture as possible, and stamp them in a stone mortar very small and fine; then put them into a clean linen bag, and hang that in a vessel with clean water, changing the water once or twice a week: when you have occasion to use it, take as much as you want out of the bag, squeezing the water from it, and put it on the mould.

pressing it down gently with a sponge, which will soak up the water, and make the impression more perfect: this being done, set the mould to dry in the sun, or in a warm room; and, when dry, the impression will come off fair, and as sharp as if cast in fine plaister of Paris.

To cast vegetables in moulds peculiarly prepared for silver:—Take fine and clear clay, or spalter, that is dry, and pound it fine in a mortar; then take a copper or iron pan, put in your clay, and give it a brisk fire; and after you have heated it thoroughly, take it off, and let it cool; then take one part of this clay, one part *alumen plumosum*, grind them together, and cast the mixture in little tints, which put into a fire to anneal: beat it very fine; and, when you would form your plant, take one part of this powder, and one part of *alumen plumosum*, grind them together, and add as much of the clay powder as the mixed matter doth contain, and mix and grind them all together. Then take some potter's clay to make a coffin round your plant; spread it in what manner you think proper, and after the coffin is dry, anoint the inside thereof, as also the plant, with good brandy; dust the before-prepared clay, and the plant, gently, through a fine cambrick; and when you have covered it all over as thick as it will bear, strike the raised coffin a little with your hand or hammer, and the dust will settle closer to the plant, and make the silver, cast in, come out the sharper.

After the powder is well settled, and your coffin closed, cover it fine with dead charcoal, and then lay some live ones over them; let the fire gradually descend to the coffin, and heat it by degrees to a strong glue; then let it cool of itself with the fire: take afterwards fine clay, fine sand, and some wool shearings; mix this together, beat and knead it well into one another; then temper it with glue, and

fill your coffin with it all over the plant, leaving an opening at the stalk for the inlet; then put it again into the fire, and make it red hot; and, with a pair of bellows, first closed, draw out the ashes from the inlet, and it will be ready for casting.

Then take oil of tartar, which is made of pounded salt of tartar, and scrape a little sal-armoniac into it, to give it the substance of a thin paste, which is a good flux for silver: throw some of this upon your silver when in fusion, and it will cast fine and sharp.

After it is cast, anoint the silver plant with oil of tartar, lay it on live coals, anneal it, and then boil it in tartar, to which you add a little salt, and this will give it a fine bright pearl colour.

A curious method to cast all sorts of things in gold, silver, or other metals:—First, pound plaister of Paris, or alabaster, to a fine powder; sift it through a cambrick, or very fine hair sieve, and put it into an iron pan over a clear coal fire; stir it about until it begins to boil and bubble up like water: keep it stirring, recruit your fire, and continue this until you find it so thick as not to be able to draw it along with your stick; then pour it into a bowl, and let it cool. Take also brick dust finely powdered and sifted.

The miners find sometimes a matter in the iron mines, which they call liver ore; take this, wash it from the coarser sand; and, when dry, put it into an earthen pot, cover it, set it to Neal thoroughly, and, when cold, pound and sift it: when it is rightly burnt it will be of a copper colour: put all these powders into several different boxes, and preserve them from dust and soil for proper use.

To cast vegetables and insects:—Four parts of the above plaister of Paris, two parts brick-dust, and two parts liver

ore; mix them well together, and sift them through a fine hair sieve; and, when you are ready to form your moulds, pour clean water to them; stir them well together to the thickness of a thin paste; but you must be pretty nimble with this work, else it will harden under your hands, and be of no use.

The mould you prepare thus:—Take the plant you design to cast, and spread the leaves and stalks so as not to touch one another; then make a coffin, either of lead or clay, put your plant in it so as not to touch the coffin; at the bottom you may lay a piece of paper to keep the stuff from sticking to the board, but let your stuff be neither too thick nor too thin; for, if it is of a right consistence, it will force itself close to the plants, and come out sharp: let the stalks be carefully kept up for the inlet; and, when you pour this stuff upon your plants, do it gently, and separate those leaves which might lie close to one another with a needle, pouring all the while to make the mould the stronger. After this is hardened, put it in a dry place, and keep it until you have some more ready to cast, but you must secure it from frost.

If you would cast insects, or any small animal, or reptile, put them in what position you will, upon a little board, brown paper, or pasteboard, which first must be anointed with oil; in order to make the plaister stuff come off the easier; about your insect make a little coffin, and if you can raise the insect so as to be freed from the board or paper, it will be the better, which you may do by tying it with two or three hairs, fastening them at the top of the coffin, and by this means it will hang in the middle thereof; when this is ready, pour, as before directed, your plaister gently upon it; and after the mould is a little dry, it will be fit for use.

If you lay your insect, or other creature, upon the paper, you must make a wall about, and cast your plaister upon it; let it stand a little, and, when dry, take off your wall, and cut the plaister round about the insect; and, taking the mould off the paper, there will be an opening at the bottom of the mould where the insect lies: turn this mould, and anoint it about the opening, and the part on the insect, with oil; then, casting some fresh plaister upon that plate, your mould will take asunder, and be very convenient to draw out the ashes of the insect, after it has been burned as as is here directed.

Put your mould upon some warm wood ashes; then cover it with small coal; over the small coal lay charcoal, and then throw some lighted small coal over them to kindle the others, so that the heat may be gently conveyed to the mould; after it has glowed some time, and you think the insect, or plant, is consumed to ashes, let it cool of itself with the fire about it to prevent the air coming to it. When your mould is cold, open the hole for the inlet, and either with your breath, or with a little hand-spout that is moist, draw out the ashes, and your mould is ready.

You may also burn those moulds in a muffle, if you close the muffle to prevent the air coming in, and lay the coals on and glow it as has been directed. After you have taken out the mould, put the same in warm sand; and, having your silver or other metal ready melted, pour it in quick; but if you cast silver, throw into the flux a little sal-armoniac and borax, mixed together; after it is cast, let the mould cool a little; then quench it in water, and the plaister will fall off of itself; brush the silver clean, and anneal and boil it as has been already directed.

To cast vegetables or insects in another manner:—Tie your plant, sprig, or insect, with a fine thread to a little

stick; dip either of them into brandy, and let it dry a little; then temper your plaister of Paris, prepared as before directed, with water of sal-armoniac, pretty thin, and dip your plant or insect in it all over; then put the little stick in the hole against a wall, or any thing else; let it hang free, and in the drying you may display the leaves of the plant, or legs of the insect, as you would have them: and when you have done this, hang it in the coffin; the little stick may rest on each end of the coffin: then, pouring your plaister over, you will have an exact mould; then proceed as directed before.

If you would have a small insect to stand upon a leaf, then dip the ends of its legs in turpentine, and put it on the plant before you dip it: if it is a spider or grasshopper, or any other insect which you think will be too strong for the turpentine, kill it first in vinegar; and after that put its legs in the turpentine, and fix it to the leaf of the plant.

To cast figures or medals in brimstone:—Melt in a glazed pipkin half a pound of brimstone over a gentle fire; with this mix half a pound of fine vermillion; and when you have cleared the top take it off the fire; stir it well together, and it will dissolve like oil: then cast it into the mould, after being first anointed with oil, let it cool, and take it out; but in case your figure should change to a yellowish colour, you must only wipe it over with *aqua fortis*, and it will look like the finest coral.

How to form and cast all manner of small birds, frogs, fish, &c.—Take an earthen, iron, or tin ring, which is high and wide enough to hold the animal you design to cast, and set the ring upon a clean board, or pasteboard; then lay the animal upon it, and cast the fine mixture of plaister pretty thick over it; the rest of the vacancy you

may fill up with a coarser plaister, even to the brim. When this is done, and pretty well dried, turn your ring, and putting a little short stick close to the body of the animal, cast a crust on that side, to cover that part which lay close to the board; and, when dry, burn it, and go about the casting as directed; after you have burned or glow'd it thoroughly, you must dry the ashes out of the hole which is made by the little stick, and this you may use for your inlet.

How to cast small shot:—Melt your lead in a ladle; then pour it gently in a continual stream into a pan or pail of water, on the surface whereof swims oil of a finger thick, and you will have a good round small shot.

Of casting in plaister:—If you will make a mould to cast an image or animal in, take clean potter's clay, make thereof a coffin round about the image, which you lay long ways on a board. and anoint it over with oil; then take fine plaister of Paris, mix it with water, and pour it all over the image, so that it may cover it every way; then give it a stronger coat with a coarser sort; and when the plaister is dry, take off the coffin, and cut that side which is cast something flat, making some notches or marks upon it; then turn it, and make a coffin about it again, and cast that side of the image, after you have anointed it with some oil all over, so that the whole may be entirely inclosed.

After the plaister has been a day or two upon the image, it will be quite dry; then, with a wooden mallet, beat cautiously against the plaister till a piece thereof loosens, which being taken off, the rest will come off easy: and after you have dismantled the whole, anoint the inside thereof with linseed oil with a fine hair pencil brush, and let it dry in: this do twice; and after they have lain two

or three days, cut in an inlet where you think it most convenient; and when you will cast with plaister of Paris, before you do it, anoint the inside of the mould; and after you have put all the pieces in their places, and tied them together, cast your plaister, and let it stand half a day; take the pieces, one after another, carefully off, in order to keep the image intire; but if you will cast wax in that mould, put only the mould, for half an hour before, in water, and the wax will not stick to it. If you will have the image hollow, then mind that the wax be not too hot; pour it into the mould, and you will easily see how thick it sticks to it. When you think it is thick enough, then turn your mould about, and pour out the wax that is remaining; and after you have, for a little while, laid it in water, take off the pieces of moulding, and you will have the image done to perfection. You must observe, that before you break the mould from the image on which you formed it, you must mark it all over with crosses, circles, or strokes, by which you may afterwards fix them right and exactly together, to cast again. If you will have the wax figures solid, then let the mould, with the images, lie for half an hour, or more, to cool, in fair water.

To prepare the wax:—Take one pound of white rosin that is not greasy, and two pounds of wax: melt the wax, strain it through a cloth into a glazed pan, and stir it about till it is cool.

To cast medals and other things in bass relievo:—Lay your medal on a clean piece of paper, or a clean board: inclose it with a wall of clay or wax, then pour the plaister of Paris half an inch thick upon it; when it is dry, take off the mould, and anoint it with clear fallad oil two or three times, both within and without. If you will cast plaister of Paris, lay the mould first for a quarter of an

hour, in clear water; then cast your plaister as thick as you please.

You must observe, that whenever you make a mould of plaister, let it be for bass relievo or figures, you must always anoint it with oil two or three times, which will not only preserve them from the damage they otherwise would sustain from the water, but make the cast pieces come out clear.

Medals and figures in bass relievo, how to cast them like jaspis:—To do this you must have a hand spout, or a glyster pipe; at the end whereof fix a tin, or iron plate, full of round holes, some larger than others: in this spout put a paste made of fine chalk of several colours; then force them out in small shreds of mixed colours, in one piece; cut them with a fine edged knife in thin round slices, and put one into your mould, pressing it down gently; then pour the plaister of Paris upon it, and, when dry, lay it first over with fish glue, and after that varnish it, and it will be of singular beauty.

The colours you may first dilute with gum-water, before you mix the chalk with them.

Another:—Take the above-mentioned chalk paste; and after you have mixed therewith a variety of colours, as smalt, white lead, vermillion, red-lead, masticot, verdigrise, brown red, &c. and formed each colour separate into little cakes; then, with a rolling-pin, spread them like pyecrust, and when you have as many colours as you think proper, lay one leaf upon another, roll them together from one end to the other, and, with a knife, cut slices as thin as a wafer; take these and cover your mould with them, press it close down with your thumb, and pour the plaister of Paris over it: when dry, do it over with fish glue, and then varnish it, or give it a polish with a dog's tooth.

To cast fish, reptiles, fruit, or any kind of things, in a pewter plate, or dish:—Take a pewter plate or dish, garnish the same with either fish, reptiles, fruits, plants, &c. dispose them in proper order, as your fancy directs you: small animals, or leaves of plants, fasten to the dish with a little turpentine; and when every thing is in order, wall it round; then pour your plaister of Paris over it; strike upon the table the dish stands on, in order to make the casting fix the closer about the things: after the plaister is dry, make the mould for the back part of the dish; glow it in order to burn the things to ashes; and having cleared your mould, fix them together for casting, then tie them round with wires, and make them red hot: cast your pewter; and in order not to make the dish too heavy, convey some little openings from the back part of the mould to the body, or hollow of the animals, stopping the outside close up again till your casting is over; and when you think the pewter sufficiently fixed, then open these conveyances, and pour out the pewter which may remain in the ingot, melted.

If you would cast it in silver, then model your leaves, animals, &c. each separate and hollow, that they may be afterwards foldered on.

To cast figures in imitation of ivory:—Take isinglass and strong brandy, make it into a paste with the powder of very fine ground egg-shells. You may give it what colour you please, but cast it warm into your mould, having oiled it all over; leave the figure in the mould till cold; then set them in the air to dry, and you will have them resemble ivory.

Another:—Take a sufficient quantity of egg-shells, put them into an earthen vessel, lute it well, and let them be put into a potter's furnace, and they will burn to a white calx: if after the first burning they are not white enough,

burn them a second time ; then, with parchment-glue, mix it into a mass fit to be cast in moulds, wherein let them dry ; if you will have your figures of different colours, you must colour your glue, for red, with Brazil ; for green, with verdigrise, &c.

Another mixture to cast figures in bass relievo :—Take flower of chalk, finely ground, mix it with clear glue well together ; pour it into your mould, press it with the palm of your hand, and it will come out very fine : you may do this in what colour you please.

To cast with marble colours in plaister :—Take several colours, as vermillion, Dutch pink, yellow oker, smalt, &c. temper them with water, and mix every one apart with plaister ; then take what colour you please, and first sprinkle your mould, which is best of brimstone, with one or more of them, with a little pencil or feather : then pour a colour different from what you sprinkled into the mould ; and after it is hardened, give it a gloss with wax or varnish, as pleases you best.

A sand, in which one may cast things to the greatest nicety, whether flat, or in bass relievo :—Take Fuller's earth, put it in a reverberatory furnace, so long till it is red hot ; then take sal-armoniac about one pound, dissolve it in two quarts of water ; with this water moisten the burnt earth ; and, when cool, put it into the furnace, in a red hot pan : after it has glown there, take it out again : when the heat is a little over, sprinkle it with the above water again till it is quenched : then give it another fire ; and repeat this five or six times, the more the better it will receive the metal : then grind it to a very fine powder, put it into the frame, which may be either of brass, iron, or wood ; but first moisten it a little with the aforesaid water ; then make your impression near the ingot ; and having

dried it before the fire while it is hot, cast your metal. The mould or impression will be better the second than the first time of using it; but every time you use it make it first red hot.

To make horn soft:—Take one pound of wood ashes, two pounds of quick lime, and one quart of water: let it boil together to one third; then dip a feather into it; and if, in drawing it out the plume comes off, it is boiled enough; if not, let it boil longer; when it is settled, filter it through a cloth: then put in shavings, or filings of horn; let them soak therein three days, and anointing your hands first with oil, work the horn shavings into a mass, and print, mould, or form it into what shape you please.

To cast horn into moulds:—Take horn shavings as many as you will, and lay them in a new earthen pot: take two parts of wood ashes, and the third part of lime; pour clear lye upon it so as to cover it all over; boil it well, stir it with an iron ladle till it has the consistence of paste: if you will have it of a red colour, then take red lead or vermillion, as much as you think proper, and temper it with the paste; then cast it into a mould and let it dry; and you may smooth it with a knife, and it will be of one solid piece: you may, in this manner, bring horn to what colour you will have it.

To cast wood in moulds as fine as ivory, of a fragrant smell, and in several colours:—Take fine saw-dust of lime-tree wood, put it into a clean pan, tie it close up with paper, and let it dry by a gentle heat; then beat it in a stone mortar to a very fine powder, sift it through cambrick, and lay it, if you do not use it presently, in a dry place, to keep it from dust: then take one pound of fine parchment glue, the finest gum-dragant and gum-arabick, of each four ounces; let it boil in clean clear pump-water,

and filter it through a clean rag; then put into it of the said powder of wood, as much as will make it of the substance of a thick paste, and set it in a glazed pan in a hot sand; stir it well together; and let the rest of the moisture evaporate till it be fit for casting: then pour or mix your colours with the paste, and put in oil of cloves, of roses, or the like, to give it a scent: you may mix it, if you will, with a little beaten amber: for a red colour, use Brasil ink. Your mould will be better of pewter, or brass, than of plaister of Paris: anoint it over with oil of almonds; and put your paste into it: let it stand three or four days to dry and harden; then take off your mould, and it will be as hard as ivory: you may cut, turn, carve, and plane it like other wood: it will be of a sweet scent: you may, if your mould will allow it, use several colours in one piece, leaving only in some part the natural colour of the wood in order to convince the beholder what it is. It is a fine and curious experiment.

Of the mixture for casting mirrors and other things for optics:—We find the method for preparing these mixtures prescribed by several authors, but after different ways; wherefore I shall set down only a few, which, for the generality, are best approved of; and first,

Take three pounds of the best refined pewter, and one pound of refined copper: first melt the copper, and then add the pewter to it: when both are in fusion, pour it out; and, when cold, beat it to powder: then take twelve ounces of red tartar, a little calcined tartar, three ounces of salt-petre, one ounce and a half of alum, and four ounces of arsenic: mix and stir this together; and, after it has done evaporating, pour out the metal into the mould; let it cool, and, when polished, you will have a fine mirror.

This is the composition which is commonly called, the steel mixture.

Some artists will have the arsenic omitted, because it is apt to turn the mirror into a deadish blue colour, and requires new polishing every time it is wanted for use; and they think that copper and pewter are sufficient to answer that purpose.

Another:—Take an earthen pan that is not glazed, and has stood the fire; put into it two pounds of tartar; also the same weight of chrystalline arsenic, and melt it on a coal fire. When this mixture begins to smok, add to it fifty pounds of old copper, and put it into fusion for six or seven hours, so that it may be well cleansed: then add to it fifty pounds of pewter, and let them melt together: after this, take up some of the mixture with an iron to see whether it is too hard and brittle; if so, then add a little more tin; and when you have the right temper, throw four ounces of borax over it, and let it stand in the furnace until it is dissolved; then pour it into your mould, and let it cool; when it is cold, rub it first with brimstone, and then with emery; and after the surface is made smooth and even, polish it with tripoli or tin ashes, and give it the finishing stroke with lamp-black; or, take copper one part, pewter three parts, and a very little arsenic or tartar: when these are put into fusion, let them incorporate.

Some take of copper three parts, of pewter one part, and a little silver, antimony, and white flint.

Others do it with one part of lead, and two parts of silver.

After the metal is formed and cast, it is requisite to have it smooth and well polished; the first is done with emery, then with powder of brimstone, tin ashes, or else with tripoli; the polishing is done with pulverized chimney soot of wood fires, and the ashes of willow or cedar, which will give it a fine lustre. The emery is ground to a fine dust, and moistened with water; or, steel mixtures are also made out of one pound of pewter, and one third of copper: when

these are melted, add two ounces of tartar, and one ounce of orpiment; and, when evaporated, pour the mixture out into the mould. The casting of a flat mirror or looking-glass, is done upon a flat board, which must be made dry and warm, and covered with rosin or pitch: by this means the mirror is fixed to the board: when cold, rub it with sand and water; then with emery, or flour of brimstone, and at last polish it with tin ashes.

Another sort of steel mixture for mirrors:—Take good new copper, of that sort which is used for copper wire, eight parts; fine English pewter, one part; bismuth, five parts; put it together into a crucible, and melt it. Then grease the mould all over with tallow in order to cast your metal into it: when it is in fusion, dip a hot iron into it; what sticks to it let cool. If the colour is inclining to white, it is right; but if to red, you must add some more pewter, until it has its right colour. Observe, that whatever you put to the melted metal, must first be made hot. After this manner you may form and cast whatever you please; or melt one pound of copper: throw into it eight ounces of spelter, and when the spelter is in flame, stir it with a stick or iron rod, well together: then add five or six ounces of fine pewter to it: pour it into your moulds, smooth and polish it as has been directed above, and you will have a fine and bright mirror.

To cast iron:—Take clean filings of iron, wash them in lye, and then water; mix them with as much powder of sulphur, put the mixture into a crucible, and give it a strong fire until it is in fusion: if you manage it right, it will cast clean and smooth.

To cast steel:—Take of the best and finest steel, about one pound; break it into bits, put it in a good strong crucible, and anneal it to a bright red colour. Then add

fixteen or twenty-four ounces of good common steel, and anneal it thoroughly; add then eight or ten ounces of arsenic glass; give it a violent fire, and it will melt and flux. With this composition you may cast what you please.

The arsenic glass is prepared in the following manner:—

“ Take one pound of white arsenic, two pounds of good
“ saltpetre; put it into a new pot that is not glazed, with
“ a cover that has a little round hole in the middle; lute
“ it well all round, then let it dry, and, when dry, put
“ the pot in a reverberatory fire for three hours, and there
“ will evaporate out of the hole of the cover a red poison-
“ ous fume, which you must take care of, and keep at
“ some distance from it. The second hour, move the fire
“ nearer the pot; and, when the fumes cease, close the
“ hole with some clay: at the third hour put the coals
“ close to the pot, and give it a thorough heat: then let
“ it cool of itself; and at the opening of the pot you will
“ find a white, sometimes a greenish white stone, which
“ put in a dry warm place, free from the air, to prevent
“ its melting: of this you are to take five ounces, and of
“ borax three ounces; grind it well together, and let it
“ melt in a large crucible until it is fluid: pour this into
“ a refining cup, and you will have a fine transparent
“ matter. What is not used you may preserve from the
“ air to keep it from dissolving.”

To cast iron as white as silver:—Take tartar, oil, and saltpetre, and mix it into a paste; then put iron or steel filings into a crucible; set it on a charcoal fire, throw the mixture upon it, and it will dissolve and come out like silver.

To cast plaister of Paris on copper-plates:—First rub the colour, either red, brown, or black, into the graving, and

wipe the plate clean ; then mix as much plaister as you think you shall have occasion for with fresh water, to the consistence of a thin paste ; and, having put a border round the plate, of four square pieces of reglet, pour the plaister upon it, and move it, so that it may run even all over the plate ; let it stand for an hour, or longer, according to the dimensions of the plate ; and, when you find it dry, and turned hard, take off the reglets, and then the plaister, and you will have a fine impression of the copper graving. You must observe, not to mix more at a time than you have occasion for, or else it will grow hard before you can use it.

A mixture which may be used for making impressions of any kind, and which will grow as hard as stone :—Take clean and fine sifted ashes, and fine plaister of Paris, of each an equal quantity, and temper the mixture with gum water, or with size of parchment : knead it well together, and press it down into your mould, but do not prepare more than what you use presently, else it will harden under your hands. You may give it what colour you please : in mixing it for black, take lamp-black ; for red, vermillion ; for white, flake white ; for green, verdigrise ; for yellow, Dutch pink, &c.

You may, instead of gum or size, use the whites of eggs, which is more binding.

To impress figures in imitation of porcelain :—Calcined and fine pulverized egg-shells, worked with gum-arabic and the white of eggs into a dough ; then pressed into a mould, and dried in the sun, will come out sharp, and look fine.

Of BRONZING.

BRONZING is colouring by metalline powders, plaister, or other busts and figures, in order to make them appear as if cast of copper or other metals.

This is sometimes done by means of cement, and sometimes without, in the instance of plaister figures; but the bronzing is more durable and secure when a cement is used.

Gold powders, and *aurum mosaicum*, are frequently employed for this purpose; but the proper bronzing ought to be of a deeper and redder colour, more resembling copper, which effect may be produced by grinding a very small quantity of red lead with these powders; or the proper powder of copper may be used, and may be prepared as follows:

“ Take filings of copper, or slips of copper-plates;
 “ which dissolve in any kind of *aqua fortis*, and put into a
 “ glass receiver, or other proper formed vessel. When the
 “ *aqua fortis* is saturated with the copper, take out the
 “ slips of the plates; or, if filings were used, pour off the
 “ solution from what remains undissolved; and put into it
 “ small bars of iron, which will precipitate the copper
 “ from the *aqua fortis* in a powder of the proper appearance and colour of copper. Pour off the water then
 “ from the powder, and wash it clean from the salts by
 “ several successive quantities of fresh water.”

The true gold powder may be well and easily made by the following method:

“ Take any quantity of leaf gold, and grind it with
 “ virgin honey, on a stone, till the texture of the leaves

“ be perfectly broken, and their parts divided to the minutest degree. Then ~~take~~ the mixture of gold and honey from off the stone, and put it into a china, or other such bason, with water: then stir it well about that the honey may be melted, and the gold by that means freed from it. Let the bason afterwards stand at rest till the gold be subsided; and when it is so, pour off the water from it, adding fresh quantities till the honey be entirely washed away; after which, the gold may be put on paper, and dried for use.”

The *aurum mosaicum*, which is tin coloured, and rendered of a flaky or pulverine texture by a chemical process, so as greatly to resemble gold powder, is prepared in the following manner:

“ Take of tin one pound, of flour of sulphur seven ounces, and of sal-ammoniacus and purified quicksilver, each half a pound. Melt the tin, and add the quicksilver to it in that state; and when the mixture is become cold, powder it, and grind it with the sal-ammoniacus and sulphur till the whole be thoroughly commixed: calcine them then in a matraass, and the other ingredients subliming, the tin will be converted into the *aurum mosaicum*, and will be found in the bottom of the glass like a mass of bright flaky gold powder; but if any black or discoloured parts appear in it, they must be carefully picked or cut out.”

Where the appearance of brass is designed, the gold powders, or the *aurum mosaicum*, may be mixed with a little of the powder, called, *argentum musivum*; the preparation of which is treated of under the article Silvering.

Where the appearance of silver is wanted, the *argentum musivum* is the best and cheapest method, particularly as it will hold its colour much longer than the true silver used in either leaf or powder.

Where no cement is used in bronzing, the powder must be rubbed on the subject intended to be bronzed, by means of a piece of soft leather, or fine linen rag, till the whole surface be coloured.

The former method of using cement in bronzing, was, to mix the powders with strong gum-water, or isinglass size; and then, with a brush, or pencil, to lay them on the subject; but at present, some use the japanners' gold size; and proceed in all respects in the same manner as in gilding with the powders in other cases; for which ample directions will be given.

This is the best method hitherto practised; for the japanners' gold size binds the powders to the ground, without the least hazard of peeling or falling off, which is liable to happen when the gum-water, gloves, or isinglass sizes are used; though, notwithstanding the authority of the old practice for the contrary, even these cements will much better secure them when they are laid on the ground, and the effect, particularly of the *aurum mosaicum*, will be much better in this way than the other. The gold size should be suffered, in this case, to approach much nearer to dryness than is proper in the case of gilding with leaf gold, as the powders would otherwise be rubbed against it in the laying them on.

The fictitious silver powder, called, the *argentum musivum*, may, as abovementioned, be applied in the manner of bronze, by those whose caprice disposes them to silver figures or busts; but it is the only sort of silver powder that should be used in this way, for the reason above given; and all such kind of silvering is much better omitted; for the whiteness itself of plaster in figures or busts, and much more a shining whiteness is injurious to their right effect, by its eluding the judgment of the eye, with respect to the proper form and proportion

of the parts from the false and pointed reflections of the lights, and the too faint force of the shades. To remove which inconvenience, it is probable, was the first inducement to bronzing.



The METHOD of PREPARING and MOULDING PAPIER MACHE.

THE *papier mache* is paper reduced to the consistence of a pulp by boiling and beating, till it be of such consistence, that, being cast in a moist state, in proper moulds, it will receive the form or impression of the figure of the mould; and, being previously commixed with some gummy, or other adhesive body, will acquire a considerable tenacity and hardness so as to retain the figure, and answer the end of wood turned, or carved, or plaister cast into the same form.

The paper used for making *papier mache* may be of any kind, according to the nicety required in the work to which it is applied. For very coarse purposes, common brown may be employed; and, for the most nice, writing paper is best. It is not very material whether the paper be clean or foul, or whether it be written or printed upon, or blank, except where it might be intended to be only moulded, and not coloured; or varnished afterwards, which is seldom the case.

The gum, or adhesive body, used for giving due texture to the *papier mache*, may be gum-arabic, glue, or isinglass; but, for ordinary purposes, gum-arabic, or glue, are used

if glass being too dear; and, indeed, gum-arabic has an advantage over either of the others, of not shrinking near so much in drying.

The preparation of the *papier mache* may be as follows:—
 “ Take any quantity of paper, and boil it in water, stirring
 “ it about with a wooden spatula, till it become of a pulpy
 “ substance, and appears to have lost its cohesion; pour
 “ off then the water from it, and beat it in a mortar, or
 “ such kind of machine as will have the same effect, till it
 “ be perfectly soft and yielding pulp. Prepare, in the
 “ mean time, a strong gum-water, by dissolving gum-
 “ arabic in water; and, having pressed the greatest part of
 “ the water out of the pulp, add the gum-water to it, in
 “ such proportion, that they produce together the consistence
 “ of a thick fluid. Put them then into a proper vessel,
 “ and boil them slowly, till they form a paste of the right
 “ consistence for casting.” The *papier mache* will then be
 ready prepared for working with the proper moulds; but
 the stiffness of the paste may be varied according to the
 nature of the work. That intended for pieces where the
 figure is simple, and has no sharp or embossed work, re-
 quiring to be stiffer, while embossed work, or other, such
 as has relieved parts, should be thinner. The using glue
 or size, instead of gum-arabic, makes a saving, and will
 answer extremely well in the case of boxes, or any other
 pieces of a simple or flat form, because the shrinking may
 be allowed for in the figure of the moulds; but for em-
 bossed work, or designs, where several parts must be joined
 together, the use of gum-arabic will be found more ex-
 pedient, as the relative proportions will be much better
 preserved.

The moulds, in which the *papier mache* is cast, may be
 either of plaister of Paris, or wood. For embossed work,

or designs of a more complex kind, plaster is preferable; but for boxes, cups, or simpler forms, the moulds may be best of wood, as such will last for a long time, and not require renewing so often, from the unavoidable wear, or the injury of a slight accidental violence, as those made of plaster: but in the choice of moulds, and subjects to which they are applied, regard should be had to the figure with respect to its roundness, or projecting parts; for, embossed work, or frames of any kind, where there are a variety of angles on one side, and a flat plainness on the other, are most expediently managed in plaster; and, where there are nice joints, as in the case of boxes, or where the figure must be preserved on both sides, wood is much more proper. The plaster moulds for casting the *papier mache*, must be made in the same manner as those for casting in plaster, see p. 233, but it is peculiarly necessary in casting the *papier mache*, to grease the moulds extremely well, otherwise there will be a cohesion betwixt the matter cast, and the moulds, that will be destructive to both. Where any subject is of considerable extension, and one side of it a blank reverse, as in the case of bas-reliefs, and other ornaments of that nature, it is usual to lay slips of whole strong paper over the *papier mache*; such paper being first well moistened with gum-water, or strong size, which is rather better in this case: this not only makes a saving, but is really an advantage to the work, as it adds greatly to the strength and tenacity, and more especially preserves it during the time of its drying, from the injuries of a slighter violence. To answer this end more effectually, the paper itself applied to this purpose should, however, be very strong; and, where the nature of the subject admits of it, laid on several times.

The wooden moulds, which are the most proper sort for forming boxes, cups, or flat pieces of any kind, where there is no embossed work, must be made in two parts; or, more explicitly, there must be a convex part, and a concave part; betwixt which a space must be allowed for the figure of the subject that is to be cast. These may be best made of box, or other hard wood turned into the proper figure; and it is expedient to have two or three small perforations, or holes, through the substance of the wood of the concave part, near the middle, to let out the fluid when the *papier-mâché* is compressed to give it the due form. The hollow, betwixt the convex and concave parts of the mould, may be about the seventh or eighth part of an inch thick, in the case of snuff or dressing boxes, or other pieces of the like magnitude: but it may be enlarged when greater pieces come in question. The moulds, when first used, should be well greased, and placed before a fire, that they may imbibe, as much as possible, of the grease, which will render the oiling them afterwards, each time they are employed, more effectual.

When the moulds are prepared, the surface of the concave or hollow part must be spread over with the paste, as evenly as possible, and, as nearly as can be judged, of the thickness of the hollow betwixt the two parts; and then the cover or solid part of the mould must be put over the paste, and compressed till it be in its proper place. The casting being thus made, it must be suffered to remain in the mould, till it gains a sufficient strength and tenacity of parts, by drying, to be able to maintain its form when taken out; and then, being freed from both parts of the mould, it must be dried and afterwards varnished or painted, according to the purpose for which it is designed.

Of the manner of moulding, &c. the whole paper for the forming snuff-boxes, cups, &c.—The manner is much the same as that of the *papier mache*; but it can be only applied advantageously to the forming a piece, where the surface is flat, and without embossed or raised work, and therefore moulds of wood are proper. The paper employed for this purpose should be of the strongest brown kind; the texture should be equal; and, if any lumps, or grosser inequalities are found, they should be taken off the paper. Being cut in pieces, of such a figure and size as may best suit the form of the mould, it should be then moistened with gum-water, till it be pliable and soft; but not so soaked or macerated, as to render it too weak and tender to bear adapting to the form of the mould. The slips or pieces should be then laid on the convex or solid part of the mould, which should be first well oiled; each should then be brushed over, after it is laid on, with a paste of a thin consistence, made by bolting flour and water for a long time, and adding afterwards about two ounces of common size to a pound of paste. Other slips must be afterwards laid on the first, in the same manner, for three or four layers, according to the thickness and strength required in the work. When there is a due thickness of the slips laid on, the hollow mould should be put over them, and pressed down to its proper place, and there continued for some time; after which it may be taken off, but the paper must not be separated from the convex or solid mould, till it has a sufficient hardness to support itself in the form given to it by the mould. Snuff-boxes, and such other pieces as have lids, or are to be made in two parts with joints, must have separate moulds for the forming the two parts, in the manner above directed for the *papier mache*; but cups, saucers, or other such pieces, may be formed on solid or convex moulds only, the exterior

surface being rendered even and smooth by dressing it with an ivory knife, or other instrument of the like kind; and a china or other cup already formed may, on occasion, serve for the mould.

The boxes, cups, &c. formed of whole paper in this manner, ought always to be afterwards coated with a good varnish, if they be intended to bear any wear, or to contain any fluid; but, if they be intended only for the ornaments of chimney-pieces, or other such purposes, they may be painted with fat oil, tempered with oil of turpentine, and mixed with any pigment of the colour that is desired to be given them.

Of the manner of preparing the matter and moulding the light japan ware:—"Take saw-dust of fir-wood, and sift off, by the use of two sieves of different fineness, all the most gross part and the smallest; melt then equal parts of rosin and turpentine, with a half part of bees-wax; and put into the melted mixture as much of the saw-dust as can be added without rendering the mass of a thicker consistence than can bear to be poured. Stir the saw-dust and melted matter together till they be thoroughly mixed, and then cast them after in proper moulds. If it be desired to render the matter harder, a little shell-lac or gum-sarcocolla may be added in powder to the mixture; but this should not be done before the saw-dust be well united with the other ingredients, and the matter should be kept no longer on the fire afterwards than may be necessary for melting and mixing the shell-lac, or gum-sarcocolla with the rest. The whole of this mixture should be used at one time, for it cannot be brought to a proper state for casting by being re-heated, without damaging it by burning."

The cups, boxes, or other vessels, formed of this matter, ought to be cast in double moulds; like the *papier mache*, which may be made of wood turned; or of lead, pewter, or other metals; but care should be always taken to grease the moulds very carefully; or otherwise, this matter being very adhesive, will glue the parts together, so that they cannot be separated without difficulty. The cups formed of this matter may be made thin, as it is very tenacious, and they will be extremely light.

This composition is not superior to the *papier mache*, or the whole paper, for making snuff-boxes, or other such pieces as are not to contain fluids; but for cups, saucers, and such vessels as are required to bear moisture, it is far preferable; and, when varnished in a proper manner, is more elegant than China, with the advantage from its lightness, of not heating so as to burn the lips, as vessels of a heavier matter are subject to do.

The manner of painting, gilding, and varnishing the snuff-boxes, or other such pieces formed of the *papier mache*, the whole paper, or saw-dust, may be the same as in other japanned work; for which directions have been given under the Treatise of Japanning. When the painting, varnishing, gilding, &c. is performed, it is proper, in all cases, where great firmness and hardness of the varnish is required, to bake the pieces in a proper stove, beginning with a gentle heat, and increasing the degree to the greatest that can be given, without changing the colour of the varnish or the painting, by burning them; but this is more particularly requisite in the case of cups and saucers made of the whole paper, or saw-dust, which are to bear hot water; for there baking them a considerable time, in a strong heat, renders the varnish proof against any injury that could be done to it, even by boiling water.

The true japan black lacquer, (which is now frequently brought from China) has been, sometimes used for the varnishing snuff-boxes, cups, and all such pieces made of the paper, or saw-dust; but this lacquer being the concreted juice of the toxicodendron tree, its poisonous qualities are almost constantly fatal to those who work with it for a length of time; and sometimes, even on very slight intermeddling with it: such a momentous inconvenience, together with the tediousness of dispatching the work on account of its great tardiness in drying, being extremely good reasons against its use, it is more advisable to employ the common kinds of varnish, which, when managed judiciously, may be rendered nearly both as beautiful and durable, without either the danger or the difficulty attending the other.

When the true japan varnish is, however, used, all heat must be avoided; for, contrary to the nature of most other substances of the same kind, this dries best when most exposed to moisture; and can, indeed, only be brought to a proper state of hardness, by keeping it in some place which is either naturally damp, or made so artificially.

Of GILDING.

THE principal kinds of gilding are those called oil gilding, burnish gilding, and jannners' gilding, or gilding with gold size; these may be promiscuously used on grounds either of wood, metal, or any other firm and rigid body; but paper and leather require a treatment, in some cases, peculiar to themselves.

The first attention, in most kinds of gilding, is the choice of leaf gold, which should be pure, and of the colour accommodated to the purpose or taste of the work. Purity is requisite in all cases, for if the gold be alloyed with silver, it will be of too pale and green a hue for any application; and, if it contain much copper, it will, in time, turn to a stronger green: the best method, however, of judging of the colour of leaf gold, with nicety, is by keeping a specimen of such as is perfect, with which any fresh parcel may be compared.

There is, besides the true leaf gold, another kind in use, called Dutch gold, which is copper gilt, and beaten into leaves like the genuine; it is much cheaper, and has, when good, greatly the effect of the true, at the time of its being laid on the ground; but, with any access of moisture, it loses its colour, and turns green in spots; and, indeed, in all cases, its beauty is soon impaired, unless well secured with lacquer or varnish.

Of the instruments that are commonly used in gilding:—The first necessary instrument is a cushion for receiving the leaves of gold from the paper, in order to its being cut into proper size and figures for covering the places to be gilt. This cushion should be made of leather, and fastened to a square board, which should have a handle; it may be of any size from fourteen to ten inches square, and should be stuffed between the leather and board with fine tow or wool, but in such a manner that the surface may be perfectly flat and even.

A proper knife is the next, and an equally requisite instrument, as it is necessary, in all cases, to cut or divide the gold into parts, correspondent to those which are to be covered: this knife may be the same, in all respects, as those used in painting, called pallet-knives; the blade

of which may be five or six inches long, and somewhat more than half an inch in breadth, with an handle proportionable.

A squirrel's tail is likewise generally provided for taking up whole leaves, and for compressing the gold to the surface where it is laid, and giving it the position required: it is used also, by some, for taking up the parts of leaves, but this is better done by means of a ball of cotton wool, which will both answer this end, and that of compressing the gold, in a more easy and effectual manner. This squirrel's tail is cut short; and, sometimes, spread in the fan fashion by means of a piece of wood, formed like a pencil-stick, but broad at one end, and split to receive the tail; but it will equally serve the purpose in its own form, when the hair is to a proper length. This instrument is, by some, called, a pallet, but improperly, as the board for holding the colours in painting, and which is frequently in use with this, being called by the same name, would necessarily produce a confusion in speaking of either.

A brush, of very soft hog's hair, or of the fitch kind, made large, is likewise commonly used for passing over the work, when it is become dry, in order to take off the loose gold.

Some fine cotton wool is also necessary for taking up the smaller parts of the leaves, and laying them on the work; as also for compressing and adjusting them when laid on: the cotton should be formed into a ball, by tying it up in a piece of very fine linen rag; for if it be used without the rag, the fibres adhere to the gold size, and embarrass the work.

A small stone and mullar, with a proportionable pallet-knife, are required to grind the mixtures made of the fat oil, or gold size, with each other; and the colours that

may be added to them; proper brushes are also wanted for laying on and spreading the fat oil, or size, on the work; and some of these should be fitches of different sizes, in order to convey and settle the gold where the relief of carved work forms deep hollows.

These are all the instruments that are common to all the three principal kinds of gilding.

Of the manner of oil gilding, and the preparation of fat oil:—The gilding with oil is the most easy and cheap, as well as the most durable kind; and, therefore, is mostly applied to common purposes: it is performed by cementing the gold to the ground by means of fat oil; the preparation of which is therefore previously necessary to be known, and may be much better managed in the following manner, than by any method hitherto taught, or commonly practised:

“ Take any quantity of linseed oil, and put it into an
 “ earthen, or any other vessel of a broad form, so that the
 “ oil may lie in it with a very large surface; but the pro-
 “ portion should be so limited that the oil may be about an
 “ inch thick in the vessel: the earthen pans used for milk
 “ in the forming cream for butter, are very well adapted
 “ for this purpose. Along with the oil, as much water
 “ should also be put in the vessel as will rise six inches,
 “ or more, above the bottom; place the vessel then, with
 “ oil swimming in the water, in an open place, where sun
 “ and rain may have access to it, but where it may be as
 “ free from receiving dust and filth as possible: let it stand
 “ in this condition, stirring the contents on every oppor-
 “ tunity for five or six weeks, or till it appear of the con-
 “ sistence of treacle: take the oil then from off the water
 “ into a phial, or bottle of a long form, or, what is better,
 “ into a separating funnel, such as is used by the chemists,

“ and there draw off the remainder of the water : place it
“ afterwards, being in the long bottle, or phial, in such
“ heat as will render it perfectly fluid, and the foulnesses it
“ may contain, will soon subside to the bottom, when the
“ clear part must be poured off, and the remainder strained
“ through a flannel, while yet warm, and the whole will
“ then be fit for use.”

It is to be observed, that this method is only practicable in summer, the sun not having sufficient power in winter to produce a due change in the oil.

This method differs from that commonly practised, in the addition of water, which suffers the foulness to separate from the oil, and sink to the bottom, where it remains, without being again mixed with the oil every time it is stirred, as is unavoidable where no water is used ; the water likewise greatly contributes to bleach the oil, and improve it in other respects.

The best previous preparation of the piece to be gilded, if it have not already any coat of oil paint, is, to prime it with drying oil, mixed with a little yellow oker, to which also may be added a small proportion of vermilion : but where greater nicety and perfection is required in the work, the wood should be first rubbed with fish-skin, and then with Dutch rushes.

This priming being dry, the next part of the operation is the sizing the work, which may be done either with the fat oil alone, (but diluted with drying oil, if too thick to be worked without), or with fat oil, and the japanners' gold size, either in equal quantities, or in any less proportion with respect to the gold size. The difference between the use and omission of the gold size, in this way of gilding, lies in two particulars ; the one is, that the sizing dries faster according to the proportion of the quantity of

the gold size to the fat oil, and is consequently so much the sooner fit to be gilded; the other is, that the gilding is also rendered in the same proportion, less shining or glossy, which is esteemed a perfection in this kind of gilding; though, taking away the prejudice of fashion, I should think the most shining, the most beautiful, and of the strongest effect.

The fat oil, or the compound of that and the gold size, must be ground with some yellow oker; and then, by means of a brush, laid thinly over the work to be gilt; but in doing this, care must be taken to pass the brush into all the cavities, if the subject be carved, or have any way projecting parts; for where the size fails to be laid, the gold will never take till the work be again repaired by going over the defective places with fresh size, which should be avoided as much as possible. Where great perfection is required, the gold should not be laid on the first sizing, but that being suffered to dry, the work should be again sized a second time; and some, who are very nice, even proceed to a third.

The work being thus sized, must be kept till it appear in a condition to receive the gold, which must be distinguished by touching with the finger; if it appear then a little adhesive, or clammy, but not so as to be brought off by the finger, it is in a fit condition to be gilt; but, if it be so clammy as to daub, or come off on being touched, it is not sufficiently dry, and must be kept longer; or, if there be no clamminess, or sticky quality remaining, it is too dry, and must be sized over again before it can be gilt.

When the work is thus ready to receive the gold, the leaves of gold, where the surface is sufficiently large and plain to contain them, may be laid on entire, either by

means of the squirrel's tail, or immediately from the paper in which they were originally put: being laid on the proper parts of the work, the leaves must then be settled to the ground, by compressing those which appear to want it, gently, with the squirrel's tail, or cotton ball; and if any part of the gold has flown off, or been displaced, so as to leave a naked or uncovered spot, a piece of another leaf, of size and figure correspondent to such spot, must be laid upon it: where the parts are too small to admit of the laying on whole leaves, or where vacancies are left after laying on whole leaves which are less, then require others to cover them: the leaves which are to be used must be first turned from the paper upon the cushion; they must then be cut into such divisions, or slips, as may be commodiously laid out on the parts of the work to be covered; after which, being separated, and taken up as they are wanted, by means of the cotton wool, to which, being breathed upon, they will adhere, they must be laid in the places they are designed to cover, and gently pressed with the cotton, till they touch every where, and lie even on the ground.

Where the work is very hollow, and small pieces are wanted to cover parts that lie deep and out of the reach of the squirrel's tail, or the cotton, they may be taken up by the point of a fitch pencil, (being first breathed upon) and by that means conveyed to, and settled in their proper place. Those who are accustomed to it, use the pencil commodiously for a great part of the work, where large parts of the leaves cannot be used.

The whole of the work being thus covered, should be suffered to remain till it be dry; and it may then be brushed over by a camel's hair pencil, or soft hog's hair brush, to take off from it all loose parts of the gold.

If, after the brushing, any defective parts or vacancies appear in the gilding, such parts must be again sized, and treated in the same manner as the whole was before; but the japaners' gold size alone is much better for this purpose than either the fat oil alone, or any mixture.

Of burnish gilding, with the preparation of the proper sizes, &c.—The gilding with burnished gold is seldom practised but upon wood; and, at present, mostly in the case of carved work, or where carved work is mixed with plain: the chief difference in the manner between this and oil gilding lies in the preparing the work to receive the gold, and in the substituting a size made of parchment, or the cuttings of glovers' leather in the place of fat oil, as a cement: the preparation of this oil should therefore be previously known; and may be as follows:

“Take a pound of cuttings of parchment, or of the leather used by glovers, and, having added to them six quarts of water, boil them till the quantity of fluid be reduced to two quarts; or till, on the taking out a little, it will appear like a jelly on growing cold; strain it through flannel while hot, and it will be then fit for use.”

This size is employed in burnish gilding, not only in forming the gold size, or cement for binding the gold to the ground, but also in priming, or previously preparing the work. But before we proceed to shew the manner of using it so, it is necessary to give the compositions for the proper cement, or gilding size employed in this kind of gilding. There are a multiplicity of *recipes* for this composition, which are approved of by different persons; but, as in general they vary not essentially from each other, I will only give two, which I believe to be each the best in their kinds.

“ Take any quantity of bole armoniac, and add some
“ water to it, that it may soak till it grow soft; levigate
“ it then on the stone, but not with more water than will
“ prevent its being of a stiff consistence, and add to it a
“ little purified suet, or tallow scraped, and grind them
“ together. When this is wanted for use, dilute it to the
“ consistence of cream, by parchment, or glovers’ size,
“ mixed with double its quantity of water, and made warm.
“ Some melt the suet or tallow, and mix it previously with
“ five, or six times its weight of chalk before it is put to
“ the bole, to facilitate their commixture; to which, in this
“ wet state, they are otherwise somewhat repugnant: it is
“ also sometimes practised to put soap-suds to the bole,
“ which will contribute to its uniting with the tallow.”

To prepare the wood for burnish gilding, it should first be well rubbed with fish skin, and then with Dutch rushes; but this can only be practised in the larger and plainer parts of the work, otherwise it may damage the carving, or render it less sharp by wearing off the points; it must then be primed with the glovers’ size, mixed with as much whiting as will give it a tolerable body of colour; which mixture must be made by melting the size, and strewing the whiting, in a powdered state, gradually into it, stirring them well together, that they may be thoroughly incorporated. Of this priming seven or eight coats should be given, time being allowed for the drying of each before the other be put on; and care should be taken, in doing this, to work the priming well, with the brush into all the cavities, or hollows there may be in the carved work: after the last coat is laid on, and before it be quite dry, a brush pencil, dipt in water should be passed over the whole, to smooth it, and take away any lumps or inequalities that may have

been formed; and when it is dry, the parts which admit of it should be again brushed over, till they be perfectly even: the work should then be repaired, by freeing all the cavities and hollow parts from the priming, which may choak them or hinder the relief of the carving; after which a water polish should be given to the parts designed to be burnished, by rubbing them gently with a fine linen rag, moistened with water.

The work being thus prepared, when it is to be gilt, dilute the composition of bole, &c. with warm size, mixed with two-thirds of water; and, with a brush, spread it over the whole of the work, and then suffer it to dry, and go over it again with the mixture, in the same manner, at least once more. After the last coat, rub it, in the parts to be burnished, with a soft cloth, till it be perfectly even. Some add a little vermilion to the gilding size, and others colour the work; if carved before it be laid on, with yellow and the glovers' size, to which a little vermilion or red lead should be added. This last method is to give the appearance of gilding to the deeper and obscure parts of the carving where the gold cannot, or is not thought necessary to be laid on: but this practice is at present much disused; and, instead of it, such parts of the work are coloured after the gilding, which treatment is called, Matting.

The work being thus properly prepared, set it in a position almost perpendicular, but reclining a little from you; and, having the gilding size, place all the necessary instruments above described, ready, as also a basin of clean water ready at hand: wet then the uppermost part of the work by means of a large camel's hair pencil, dipped in water; and then lay on the gold upon the part so wet, in the manner above directed for gilding in oil, till it be completely covered, or become too dry to take the gold.

Proceed afterwards to wet the next part of the work, or the same over again, if necessary, and gild it as the first, repeating the same method till the whole be finished. Some wet the work with brandy, or spirit of wine, instead of water; but I do not conceive any advantage can arise from it that may not be equally obtained by a judicious use of water. The manner is, moreover, much more troublesome and difficult, as well as expensive, for only a small part must be wet at one time, and the gold laid instantly upon it, or the brandy or spirits will fly off, and leave the ground too dry to take the gold.

The work being thus gone over with the gilding, may be then examined; and such parts as require it repaired by wetting them with the camel's hair pencil, and covering them with the gold; but as little as possible of the perfect part of the gilding should be wet, as the gold is very apt to turn black in this state. When the repaired part also is dry, the work must be matted, if it require it; that is, the hollow parts must be covered with a colour the nearest in appearance to gold; for this purpose some recommend red lead, with a little vermilion ground up with the white of an egg: but I think yellow oker, or Dutch pink, with red lead, would better answer the end; or the *terra di sicilia*, very slightly burnt, or mixed with a little red lead, would have a much better effect, and be more durable than any other mixture so near the colour of gold in shade. If glass size will likewise equally well supply the place of the whites of eggs in the composition of matting.

The work being thus gilt, it must remain about twenty-four hours, and then the parts of it that are designed to be burnished, must be polished with a dog's tooth, or with the burnishers of agate or flint, made for this purpose; but it should be previously tried whether it be of the proper

temper as to the dryness; for, though twenty-four hour be the most general space of time in which it becomes fit, yet the difference of season, or the degree of wet given to the work, makes the drying irregular with regard to any fixed period. The way of distinguishing the fitness of the work to take the burnish, is, to try two or three particular parts at a distance from each other; which, if they take the polish in a kind manner, the whole may be concluded fit; but, if the gold peel off, or be disordered by the rubbing, the work must be deemed not yet dry enough; and, if the gold abide well the rubbing, and yet receives the polish slowly, it is a proof of its being too dry, which should be always prevented by watching the proper time; for the work, when too dry, both requires much more labour to burnish it, and fails at last of taking so fine a polish.

Of japanners' gilding:—The japanners' gilding is performed by means of gold powder, or imitations of it, cemented to the ground by a kind of gold size much of the nature of drying oil, for the making of which there are various *recipes* followed by different persons: we shall, however, only give one, which is much approved:

“ Take of linseed oil one pound, and of gum animi four
“ ounces; set the oil to boil in a proper vessel, and then
“ add the gum animi gradually in powder, stirring each
“ quantity about in the oil, till it appears to be dissolved;
“ and then, putting in another till the whole be commixed
“ with the oil, let the mixture continue to boil, till, on
“ taking a large quantity out, it appear of a thicker consistence than tar; and then strain the whole through a
“ coarse cloth, and keep it for use: but when it is wanted,
“ it must be ground with as much vermilion as will give it
“ an opaque body; and, at the same time, diluted with oil

“ of turpentine so as to render it of a consistence proper
“ for working freely with the pencil.”

This gold size may be used on metals, wood, or any other ground whatever; but, before I enter on the particular manner of gilding with it, the preparation of the true and counterfeit gold powders are necessary to be shewn.

For the method of making the true gold powder, see p. 244.

A gold powder of a more intense yellow colour, brighter, than this, may be made by a precipitation from gold dissolved in *aqua regia*, by means of either green or Roman vitriol.

The German gold powder, which is the kind most generally used, and, where it is well secured with varnish, will equally answer the end in this kind of gilding with the genuine, may be prepared from the sort of leaf gold, called, the Dutch gold, exactly in the same manner as the true.

The *aurum mosaicum*, the preparation of which is given in p. 245, may likewise be used in this kind of gilding.

The *sal ammoniacus* employed in the preparation of the *aurum mosaicum*, ought to be perfectly white, and very clean; and care should be taken that the quicksilver be not such as is adulterated with lead, which may be known by putting a small quantity in a crucible into the fire; and observing, when it is taken out, whether it be wholly sublimed away, or have left any lead behind it. The calcination may be best performed in a coated glass body, hung in the naked fire; and the body should be of a long figure, that the other ingredients may rise so as to leave the coloured tin clear of them; the quicksilver, though it be formed into cinnabar along with the sulphur, need not be wasted, but may be revived by distilling it with the addition of quick-lime.

There are some other coarser powders in imitation of gold which are formed of precipitations of copper, but they are seldom used now for gilding.

Besides these powders, the genuine leaf, or Dutch gold, may be used with the japanners' gold size, where a more shining and glossy effect is desired in the gilding; but in that kind of gilding which is intended to be varnished over, or to be mixed with other japan work, or paintings in varnish, the powders are most frequently employed.

The gilding with japanners' gold size may be practised on almost any substance whatever, whether wood, metal, leather, or paper; and there is no further preparation of the work necessary to its being gilt, than the having the surface even and perfectly clean.

The manner of using the japanners' size is this: Put then a proper quantity of it, prepared as above directed, and mixed with a due proportion of oil of turpentine and vermilion, into a small gallipot; then either spread it with a brush over the work where the whole surface is to be gilt, or draw with it, by means of a pencil, the proper figure desired: avoid, carefully, not to let it touch any other parts; suffer it afterwards to rest till it be fit to receive the gold, which must be distinguished by the finger in the same manner as with the fat oil; the having a proper clamminess, or sticking quality, without being so fluid as to take to the finger, being alike the criterion in both cases; being found of a proper dryness when the gold powders are to be used, a piece of the soft leather, called wash-leather, wrapped round the fore-finger, must be dipped in the powder, and then rubbed very lightly over the sized work; or, what is much better, the powder may be spread by a soft camel's hair brush: the whole being covered, it must be left to dry, and the loose powder may then be cleared away from

the gilded part, and collected, by means of a soft camel's hair brush. When leaf gold is used, the method of sizing must be the same as for the powders; but the point of due dryness is very nice and delicate in these cases; for the leaves must be laid on while the matter is in a due state, otherwise the whole of what is done must be sized and gilt over again.

When more gold size is mixed up with the oil of turpentine and vermilion than can be used at any one time, it may be kept by immersing it under water till it be again wanted, which is, indeed, a general method of preserving all kind of paint, or other such compositions as contain oily substances.

Of gilding paper and vellum, or parchment:—There are a variety of methods used for gilding paper, according to the several ends it is designed to answer; but for the most part, size, properly so called, and gum-water, are used as the cements, and the powders are more generally employed than the leaf gold. As I have given the preparation of these several substances before, it is needless to repeat them here; and, I shall, therefore, only point out those circumstances in the manner of their use, which are peculiar to the application of them to this purpose.

Of the gilding on paper proper to be used along with painting in water-colours, or fresco:—The gilding proper to be used with water-colours, may be either with the leaf gold, or powder; which last, when mixed with the proper vehicle, is called shell gold.

The leaf gold is necessary in all cases where a metalline and shining appearance is wanted; and it may be laid on the designed ground, by means either of gum-water or isinglass size: the gum-water, or size, should be of the weaker kind, and not laid too freely on the ground, and

proper time should likewise given for it to dry ; the judgment on which must be formed in this case, as in the other kinds of gilding, by touching with the finger. The management of the gold also is much the same in this as in the former : and where a polish appearance is wanting, the dog's tooth, or other kind of burnisher may be used. In the gilding larger surfaces, it will be found advantageous to colour the ground with the gall stone ; and where colours are to be laid on the gilding, the brushing the gold over with the gall of any beast, will make it take them in a much more kindly manner.

When the gold powders are used along with paintings in water-colours, it is previously formed into shell gold, (as it is called, from its being usually put into muscle-shells in the same manner as the colours.) This shell gold is prepared by tempering the gold powder with very weak gum-water, to which a little soap-suds may be put to make the gold work more easily and freely.

Of the gilding proper for the coloured paper for binding books, and other such purposes :—This kind of gilding is performed in much the same manner as that for mixing with paintings in water-colours, except with regard to the following particulars :—First, in this case the gilding being intended generally to form some figure or design, the gum-water or size, instead of being laid on with a brush or pencil, is most generally conveyed to the ground by means of a wooden plate or print, and most expediently by an engraved roller, which makes an impression of the figure, or design intended. Secondly, as the rising of the gold from the surface of the ground is no disadvantage in this kind of gilding, as it is in that mixed with paintings, the gum-water, or size may be much stronger, which will contribute both to bind the gold firmer, and to give a sort of

embossed appearance that improves the effect. In this kind of gilding the japanners' gold size may be also commodiously employed; for, as the paper must be moistened before it be printed, there is no inconvenience liable to happen from the running of the gold size thus used: where the embossed appearance is wanted in the greatest degree, the gold size should indeed always be used; and, in this case, should be thickened with yellow oker, mixed with as much red lead as the proper working of the print will admit.

The wooden plates, or prints used for gilding in this manner, are worked by the hand, and are to be charged with the gum-water or size, of whatever kind it be, by letting it gently and evenly down on a cushion, on which the gum-water or size has been copiously spread by means of a proper brush, and then pressing it on the paper prepared by moistening with water, and laid horizontally with some sheets of other paper under it. Where the rolling print is employed, the gum-water or size must be laid on it with a proper brush, immediately out of the pot or vessel which contains it; but too copious a use must be avoided for fear of spreading it beyond the lines of the design or pattern. The subsequent management of the gold, whether leaf or powder, must be the same as in the foregoing kinds of gilding.

It rarely answers to use the leaf gold in this kind of painting, nor even the true gold powder; but the German powder, or that formed of the leaves called Dutch gold, is mostly employed, and answers well enough the purpose. The manufactures of the gilt and marble papers have not been so much cultivated in our own country as it were to be wished, since very great sums have been always annually paid, both to Germany and Genoa, on this account.

Of gilding proper for letters of gold on paper, and the embellishments of manuscripts:—The most easy and neat method of forming letters of gold on paper, and for ornaments of writings, is, by the gold armoniac, as it was formerly called, the method of managing which, is as follows :

“ Take gum ammoniacum, and powder it, and then
“ dissolve it in water previously impregnated with a little
“ gum arabic and some juice of garlic; the gum ammoni-
“ acum will not dissolve in water so as to form a transparent
“ fluid, but produces a milky appearance, from whence
“ the mixture is called in medicine, the *lac ammoniacum*.
“ With the lac ammoniacum thus prepared, draw, with a
“ pencil, or write with a pen on paper, or vellum, the
“ intended figure, or letters for the gilding; suffer the
“ paper to dry, and then, or any time afterwards, breathe
“ on it till it be moistened, and immediately lay leaves of
“ gold, or parts of leaves, cut in the most advantageous
“ manner to save the gold, over the parts, drawn or written
“ upon with the lac ammoniacum, and press them gently
“ to the paper with a ball of cotton or soft leather. When
“ the paper becomes dry, which a short time, or gentle
“ heat will soon effect, brush off with a soft pencil, or rub
“ off with a fine linen rag, the redundant gold which
“ covered the parts between the lines of the drawing or
“ writing; and the finest hair strokes of the pencil or pen,
“ as well as the broader, will appear perfectly gilt.”

The manner practised by the professed leather gilders for the making hangings for rooms, skreens, &c. is not properly gilding, but lacquering, being done by means of leaf silver, coloured by a yellow varnish on the same principle with the lacquered frames of pictures, &c. which were formerly in use. It is an important manufacture, as the

leather ornamented in this manner, not only admits of a great variety of designs in embossed work, resembling either gilding or silver, but also of the addition of paintings of almost every sort.

Of gilding glass without annealing or burning:—Glass may be gilt by applying as a cement any gold size, or other size, gum-water, or varnish; and, when it is of a proper degree of dryness, laying on the gold as in other methods of gilding. The work may also be polished afterwards in the same manner, if the burnished appearance be desired; but where that is intended, it is proper to add bole armoniac, chalk, or other such substance to the cement.

When drinking glasses are to be gilt, without burning, the cement should be either some gold size formed of oil, or some kind of varnish compounded of the gum resins, that will not dissolve in water, but require either spirit of wine, or oil of turpentine for their solution. At present, nevertheless, this is not only neglected by those who gild drinking glasses for sale, but glasses gilded with gum arabic, or the sizes which will dissolve in water, are imposed upon the public for the German glasses, gilt with the annealed gold, and sold at a dear rate under that pretence; though, after they have been used for a very short time, the gold peels and rubs off in spots when the glasses are cleaned, and renders them very unsightly. As the glasses with gilt edges are at present much in fashion, and the true kind are brought from Germany or elsewhere, the incitement of the cultivating this branch of gilding here, would not be an unfit object of the premiums of the worthy Society for the Encouragement of Arts, since for the doing this work in perfection there is nothing more wanting than that dexterity of the manoeuvre which arises from a little practice in matters of this kind.

OF SILVERING.

SILVERING may be practised on the same substances, and by the same methods, either with leaf or powder, we have before pointed out with regard to gilding, variation being made in a few circumstances below mentioned; it is nevertheless but seldom used, notwithstanding the effect would be very beautiful and proper in many cases, and there is an extreme good reason for such neglect of it: the reason is, its tarnishing in a very short time, and acquiring frequently, besides the general depravity of the whiteness, such spots of various colours as render it very unsightly; and this tarnish and specking is not only the constant result of time, but will be often produced instantly by an extraordinary moisture in the air, or dampness, as well as by the fumes and effluvia of many bodies which may happen to approach it.

Wherever, therefore, silvering is admitted, a strong varnish ought to be put over it; and this, even, is not sufficient wholly to secure it from this destructive consequence. The varnish must be some of the compositions of mastic, sandarac, the gums animi or copal, and white resin; (the particular treatment of which, in the forming varnishes, will be found in other parts of this work;) for the other substances used for compounding varnishes are too yellow. Some put a coat of isinglass size over the silver; but, besides that, the size itself injures the whiteness in time, by turning yellow; it preserves the silver, but in a small degree.

The method of making the silver powders is also the same as those of gold, except with regard to one of the

German powders, which is correspondent both in its appearance and use, abating the difference of colour, to the *aurum mosaicum*, or *musivum*, whence it has been, indeed, though improperly called, the *argentum musivum*: the process for this being, therefore, different from any before given, it is proper to insert it fully, as follows:

“ Take of very pure tin, one pound, put it into a
 “ crucible, and set it on a fire to melt; when it begins to
 “ run into fusion, add to it an equal proportion of bismuth
 “ or tin glass, and stir the mixture with an iron rod, or the
 “ small end of a tobacco pipe, till the whole be entirely
 “ melted and incorporated: take the crucible then from
 “ the fire, and after the melted composition is become a
 “ little cooler; but while it is yet in a fluid state, pour
 “ into it a pound of quicksilver gradually, stirring it in
 “ the mean time that the mercury may be thoroughly
 “ conjoined with the other ingredients: when the whole
 “ is thus commixed, pour the mass out of the crucible
 “ upon a stone, where, as it cools, it will take the form
 “ of an amalgama, or metaline paste, which will be easily
 “ bruised into a flaky powder, and is then fit for use.”

This powder may be either tempered in the manner of the shell gold, with gum-water, or rubbed over a ground properly sized, according to any of the methods above directed for gold powder, and it will take a very good polish from the dog's tooth or burnishers, and hold its colour much better with a slight coat of varnish over it than any true silver powder, or leaf.

The sizes for silvering ought to be mixed as in the case of gold, with yellow, or bole armoniac, but with some white substance whose effect may prevent any small failures in the covering the ground with the silver being seen in the same manner as the yellow substances do the gold. This

may be done with flake white, or white lead, when the sizes formed of oil are used; but whiting is the proper matter in the burnish size for silvering, or wherever the glovers', or parchment size is used. Some recommend tobacco-pipe clay in the place of whiting, and add a little lamp-black to give a silver-like greyishness to the composition.

Of the NATURE and COMPOSITION of GLASS.

THE materials employed to give a body to glass are, sand, flints, talc, spar, and some other stony and terrene fossils.

Sand is, at present, almost the only kind of substance which is used in this intention in the British manufactories of glass, and with great reason, as it extremely well answers the purpose, and does not demand the previous preparation of calcination that is necessary with respect to flints and other stones; and as it can be with certainty procured in any quantity demanded. The kind of sand most fit for making the white transparent kinds of glass, is, that brought from Lynn, in Norfolk, by the name of which place it is distinguished; and there is also another kind of this, but inferior, brought from Maidstone, in Kent: it is white and shining; and, examined by means of a microscope, appears to be small fragments of rock chrysal, from which it does not seem, by any experiments, to differ in its qualities; and the glass formed of it, may, therefore, properly be considered as made of chrysal. The introduction of it into the manufactories of glass in this country, has

almost wholly superseded that of flints, from which it no way differs in this application, but in the being somewhat slower in vitrifying, which makes it require, in proportion, a greater strength of flux and fire; but to compensate for this disadvantage, it is clearer in its own colour, and much freer from heterogeneous tinging bodies which injure the colour of the glass, and frequently give embarrassments where flints are used: the sand requires no previous preparation for common and grosser purposes, especially where nitre is used, which burns out the sulphureous matter from any filth of the nature of animal and vegetable substances, and consequently calcines them to an earth no way injurious to the glass; but for nicer purposes, and where no nitre is used, it is proper to purify, or cleanse the sand by washing, which may be thus done: Pour water upon it, and having stirred them well about, incline the vessel immediately in such a manner that the water may run off, and carry with it the filth that will float in it; by repeating which a few times, the sand will be freed from all the heterogeneous matter that is lighter than itself. For coarse glass, other kinds of sand, of a softer texture, are used; as, besides the advantage of being cheaper, they are more easily vitrifiable than flints, and consequently make a saving in the fluxing bodies which are to be added to them.

Flints are the most important article in the substances which are used for forming the body of glass; and were, indeed, the only kind employed in larger works where any better sorts of glass were manufactured, before the use of the white sand excluded them in all places where it is to be conveniently obtained: since, for the reasons above given, it is a more eligible material, unless for experiments, or where very small quantities are required; in which case, the calcined flints being more easily reduced to an impalpable

powder, may possibly be more commodiously employed than the sand. Flints, yet, however, continue to be used wherever the proper sand cannot be procured at a reasonable charge, as the sole ingredient for forming the body of the better kinds of glass; since they are, in most places where they are naturally found, to be had in extreme great quantities; and the expence of calcining them does not enhance their whole cost to a degree beyond what the current price of glass bears.

The goodness of flints, with respect to this use of them, must be distinguished by their clear transparent black colour, and all such as are marbled with brown or yellowish colour should be rejected for fear of iron, which frequently lurks in them under that appearance, and is very injurious to the colour of glass if it get admission into it; such should, therefore, be carefully picked out when found in parcels of the clearer sort; but if the greater part of any parcel appear so marked, it should not be used till trial be made in a small quantity, whether the discolouring be owing to any substance detrimental to the colour of glass or not. It is always necessary that flints should undergo a calcination before they be used in the composition of glass; as well because they are not otherwise to be reduced to a texture, which will admit of their being powdered in order to their due commixture with the other ingredients; as, because they are not susceptible of vitrification till a proper change be produced in them by calcination. This calcination must be performed by putting them into a furnace of a moderate heat, being first dipped in water, and continuing them there till they become intirely white, even to the most interior part, which will require a greater or less time, according to their magnitude, and the degree of the heat of the furnace: when they are thus rendered white, they

must be taken out of the fire, and instantly immersed in cold water, where they must remain till they be again cold, and then they will be found, if duly calcined, to be cracked and shivered into flaky pieces, and to become so swiftly brittle as to be easily reducible to powder; some part will, nevertheless, be always found insufficiently calcined, which may be distinguished by their harder and more obdurate consistence; and they must be carefully separated in order to be re-calcined, as they will otherwise greatly retard and impede the powdering of the duly calcined parts; those which are properly calcined, must then be levigated by means of mills or other implements, accordingly as the quantity or opportunity may make it expedient; and they will then be fit for using in the compositions for glass.

Talc of various species has been likewise used in the same intention as sand and flints, but seldom in large works; it sometimes requires a calcination in order to its due preparation for entering into the composition of glass; but neither so great a heat, nor the quenching in cold water, are necessary for bringing it to a proper texture to bear powdering. Some sorts of talc are much more quickly vitrifiable than others; and fusing easily with either salt of tartar, or lead, may therefore be used in default of flint, or sand sufficiently white; but with respect to larger manufactures, the use of flints is more eligible, as they are to be procured in great quantities with more certainty; and will, in general, require much less flux and fire to bring them to a due state of vitrification.

Several other, both earthy and stony fossils, have been likewise used for forming the body of glass; and it has been observed, that most kinds of stony substances which will scintillate, or strike fire with steel, are vitrifiable within the degree that fits them for this purpose; but as

they are neither used at present, nor promise to be any way advantageous in practice, as far as is hitherto known of them; I shall omit enumerating them as being foreign to the purpose in hand, except with respect to two kinds; the one of these is called, Moilon, by the French, and is found in great quantities, as an upper crust in many free-stone quarries; and, as it may be used without any previous preparation, and is very quickly vitrifiable, may be serviceable on some occasions to those who may want to form glass, or vitreous compositions, where this may be procured with more ease than any of the before-mentioned substances: the other is the white round semi-transparent river pebbles, which vitrify very soon; and, if chosen colourless, make a very white glass; but they must be calcined as the flint, by putting them into the flint till they be red hot, and then quench them in cold water to bring them to a state fit to undergo powdering.

Knuckle confounds the calcined flints, and all other stones used for making glass, under the name of Sand, in his receipts, notwithstanding he admits of a great difference in their readiness to be vitrified, as in the case of calcined flints, and the softest kind of natural sand; where one hundred and forty pounds of salt are required to an hundred and fifty pounds of calcined flints; and only one hundred and thirty pounds of salt to two hundred pounds of the sand.

Of materials used as fluxes in the composition of glass:—
The materials used for fluxes in the composition of manufactured glass are lead, pearl-ashes, nitre, sea-salt, borax, arsenic, smiths' clinkers, and wood-ashes, containing the earth and lixiviate salts as produced by incineration.

Lead is the present most important flux in the British manufactures of what is called flint glass; but it must be

brought, by previous calcination, to the state of minium, or what is called red lead: this, used in a due proportion, makes a tougher and firmer glass than can be produced from salts alone, and is yet procured at a very small expense; but all the glass formed of lead is tinged originally with yellow, and therefore requires the addition of nitre to burn and destroy the sulphur or phlogistic matter it contains in order to bring it to a more colourless state; which addition of nitre enhances again the cost of glass so composed that would otherwise be extremely low. There is another reason, likewise, for the addition of nitre, or some other salt, to operate as a flux in the glass compounded of lead, which is, that there may not be a necessity of using beyond a certain proportion of it; for, if glass have much lead in its composition, it will suffer a corrosion by the air, which gives a greyish dulness to its surface that is very injurious both to its beauty and utility. It is needless here to teach the manner of calcining lead, because it is done in works appropriated to that purpose, and is sold by the proprietors of those works at a cheaper rate than any particular person could pretend to manufacture it for their private use. The perfection of red lead lies in its being thoroughly well calcined, which is best distinguished by its redness, inclining to crimson, and in its being pure, which may be judged of by the brightness of its colour. There is, indeed, no materials of a red colour cheap enough to adulterate it with, except powdered bricks, or some of the red okers, and they would immediately shew themselves in the vitrification of the smallest quantity, by the strong yellow tinge they would give the glass.

Pearl-ashes is the next leading article among the substances used as fluxes in glass; and they at present mostly supply the place of the Levant ashes, the Barillas of Spain,

and many other kinds, which were formerly brought here, as well for making glass as soap. In the kinds of glass where perfect transparency is wanted, as in looking-glass plates, and all kinds of window-glass, salts are preferable as a flux; for, as all the lixivate or fixed alkaline salts of vegetables are the same for this purpose, when pure, and those called pearl-ashes are purer than any other which can be provided at a moderate expence, the use of them is more expedient than of any other. This kind of fixed alkaline salts, called pearl-ashes, is prepared in Germany, Russia, and Poland, by melting the salts out of the ashes of burnt wood; and, having reduced them again to dryness, evaporating away the moisture, and calcining them for a considerable time in a furnace moderately heated; but, as they cannot be prepared with advantage in this country, and are to be had at a reasonable price by those who may have occasion to use them in making glass, I shall wave entering more particularly into the detail of the process by which they may be best and most profitably produced, as not properly falling either within the design or the intention of this work. The goodness of pearl-ashes must be distinguished by the equal and white appearance of them, as it consists in their purity, and their having been calcined for a long space of time, of which the whiteness, and equal appearance, are marks, unless in the case of some parcels that contain lumps of a bluish cast produced by calcination; which discolouring is not, however, any proof of their being bad; but any brownish cast in particular parts, or greyness in the whole, is a certain criterion of their not being good: this must, however, be confined to such as are perfectly dry, which can only well be on the opening the casks they are brought over in; for, if the air have access to them, they soon deliquiate, and look brown or greyish,

from a semi-transparency they acquire in that deliquating state. There is one, and the most common adulteration, which is made in these salts, that is not easily distinguishable by the appearance; it is, the addition of common or sea salt, to them, which is sometimes copiously made; this is not, however, very detrimental in the application of them to the forming glass; but it is, nevertheless, a disadvantage considerable enough in large concerns, to buy one thing for another at six times its current price. As it is expedient, therefore, to know how to distinguish this fraud, the following method is proposed as easy and certain:

“ Take a quantity of the salt suspected; and, after it
 “ has lain in the air so as to be a little softened, but not
 “ melted, put it in a fire-shovel, and hold it over the fire
 “ where the heat is pretty strong. If it contain any
 “ common salt, a crackling, and as it were, slight explosion, will follow, as the salt grows hot; which decomposition is a certain mark of common salt wherever it is
 “ found.”

The pearl-ashes require no preparation, except where extreme great transparency is required, as in the case of looking-glass, and the best window-glass; in which case, a purification is necessary, in the manner which will be shewn in speaking of these particular kinds.

Nitre, which, in its refined state, is commonly called saltpetre, has been formerly much used as a flux in the finer kinds of glass, and is now likewise employed in most compositions of the same nature: but this is a noted one by those who are at all acquainted with the principles of the art, not so much in the intention of a flux, as of that of a colorific ingredient, from its power of rendering glass colourless, by destroying the phlogiston in lead, or in any kind of vegetable or animal matter which may tinge the

Glass. As a flux, it is less powerful than fixed alkaline salts of vegetables; and, being much dearer, its use would, therefore, be in proportion less expedient than that of pearl-ashes, if it were to be employed in this view only. The saltpetre that is used here is brought from the East Indies, in the form of what is called, crude nitre; and, in commercial language, rough-petre; in which state it is commixed with some proportion of common salt: it is refined by persons who make it their proper business, and bought for the purpose of glass-making, in the state of saltpetre, on which account it is unnecessary to give the process for refining it here. If it be obtained in chrystals of such a size that the figure of them may be distinguishable, there is no hazard of any adulteration but what would be very apparent, as no heterogeneous matter can be made a proper part of such chrystals; and, therefore, if they appear bright and colourless, the goodness cannot be doubted.

Sea salt is also frequently used as a flux in the making glass of various kinds; and it has a very strong power in promoting vitrification even in some obdurate bodies; but used in a large proportion, it does not produce so strong and tenacious a glass as lead, or even the alkaline salts of vegetables, and is therefore only taken in aid of the others, when admitted as an ingredient: it should be brought to a dry state by decrepitation, that is, keeping it in a moderate heat till it ceases crackling, before it be put with other ingredients into the fusing heat; otherwise, by the little explosive bursts of its parts, it will drive some of the powdered matter out of the pot. It must not, after such decrepitation, be again exposed to the air; for, if it be, it will regain its former quality, of crackling in a short time.

Borax is the most powerful flux of all the salts; or, indeed, of any known substance whatever; but, on account of its great price, can only be admitted into the composition of glass designed for looking-glass plates, or other purposes, where a considerable value can be set upon the produce; or, where the quantity wanted is very small. It is brought from the East Indies, under the name of Tincal, and the refinement of it, in a perfect manner, is hitherto known but to few persons in Europe, who carefully keep it a secret. The knowledge of it, however, is not important to the art of making glass, as it is always procured for that purpose in a refined state, and not used in very large quantities: the purity of it may be ascertained by the largeness and clearness of the crystals; for when it is had in that state, it may always be concluded good. The previous preparation of borax for the composition of glass, is, to calcine it with a gentle heat, which converts it to a flaky, feathery kind of substance, like calcined alum; after which it should be ground to powder, and is then fit to be commixed with other ingredients. This calcination of borax should be with a gentle heat, and in a very large vessel proportionably to the quantity; for it swells and rises in inflated bladders so as to occupy a very great space.

Arsenic is also a powerful flux, but must not be added; nevertheless, in too great quantity; for, though when once vitrified perfectly, it greatly promotes the same change in other substances; yet, when added in a redundant proportion, it turns the glass milky or opaque, and keeps it in that state a considerable time before it will duly assimilate, from whence the due vitrification is greatly retarded, so as to occasion an intolerable loss of time and fuel; though the glass in all such cases would become clear, if continued long enough in the fire; yet, on this principle of its

Whiteness, in vitrifying when added to compositions of glass in a large proportion, it is used for giving an opaque white colour to glass, as we shall see below.

Wood ashes, by which is to be understood, likewise, those of broom, furze, or any other burnt vegetable, are used as a flux for the common bottle or green glass; the ashes must be taken in their original state, consisting of the calcined earth of the vegetable, and their lixivate, or fixed alkaline salt, as their virtue lies in their original manner of commixture; for this very extraordinary circumstance attends them, that, though in their primitive state, they vitrify easily, and act as a strong flux to any of the vitrescible earths or stones; yet, if the salts be separated from the earth, by solution in water, the earth from that time becomes extremely repugnant to vitrification; and, though the same salts which were taken away from it, or even a much larger quantity be again added to it, it resists their fluxing power, and displays a nature intirely different from that which it appeared to have before its separation from the salts. There is no preparation necessary for these ashes in order to their entering into the composition of glass, except the sifting them to free them from all the fragments of charcoal, or unburnt parts of vegetables employed in their production; but they should be carefully kept from damp and moisture which would make the salts deliquiate, and run off from the earth. The goodness of these ashes must be distinguished by their appearing free from impurities, and by their whiteness: and their abounding in salt, is likewise a proof of their excellence, which may be examined by making a lixivium of any known small quantity, and judging of its weight.

Of the several kinds of white glass, and their compositions in general:—The several kinds of white transparent

glass now in use, in this part of the world, are, the flint-glass, (as it is here called) and the German crystal-glass, which are applied to the same uses and purposes; the glass for plates, for mirrors, or looking-glasses; the glass for windows and other lights; and the glass for phials, and such kind of small vessels.

Of each of these kinds there are several sorts; some only differing in the particular composition and management of the directors of the works where they are manufactured, but alike in their price, and the uses to which they are applied; and others, which are allowedly inferior sorts, sold at cheaper rates, and employed accordingly for coarser purposes.

The several kinds of glass differ in the substances employed as fluxes in forming them, as well as the coarseness and fineness of them which are used for their body. The flint and crystal, mirror, and best window-glass, not only require such purity in fluxes as may render it practicable to free the glass perfectly from all colour; but, for the same reason also, either the white Lynn sand, calcined flints, or white pebbles should be used: the others do not demand the same nicety in the choice of the materials, though the second kind of window-glass, and the best kind of phial, will not be so clear as they ought, if either too brown sand, or impure salts, be suffered to enter into their composition. It is to be greatly regretted, that the very important manufacture of glass, should not be so cultivated and encouraged in Great Britain, as to prevent totally the importation of foreign: whereas, from the production of sand, lead, and coals, in our own country, we may make the best sorts of glass much cheaper than can be done elsewhere: we yet, however, take looking-glass plates of France, to the amount of a very considerable sum; some window-glass of the Dutch:

and the German drinking-glasses for water, with gilt edges, and other ornaments, are now coming again extremely into fashion. The causes of this demand for foreign commodities, which are, or might be better, and cheaper manufactured here, are various; and the displaying of them not being a proper part of my business at present, I shall wave it; and only intimate, that the tax laid upon glass (against all the principles of good policy) has greatly corroborated them, as well as checked a growing exportation of some articles, which would probably, in time, have been of very great consequence to our commerce.

Of coloured glass:—For blue, take four ounces of calcined and pulverized rock crystal, two ounces of saltpetre, one ounce of borax, half a pound of manganese, one pound of indigo blue.

A crysolite glass:—To one pound of frit, take pulverized verdigrise three ounces and a half, red lead one ounce.

A sapphir green glass:—To one pound of the above composition, or chrysal frit, take one ounce of good saffer, and of a curious fine pin-dust two pounds.

JEWELLERS' SECRETS.

TO imitate fine oriental pearls:—Take of thrice distilled vinegar two pounds, Venice turpentine one pound; mix them together into a mass, and put them into a cucurbite; fit a head and receiver to it; and, after you have luted the joints, set it, when dry, on a sand furnace to distil the vinegar from it. Do not give it too much heat lest the stuff should swell up.

After this, put the vinegar into another glass cucurbite, in which there is a quantity of seed pearl, wrapped in a piece of thin silk, but so as not to touch the vinegar; put cover, or head, upon the cucurbite; lute it well, and put it in *balneum marie*, where you may let it remain a fortnight. The heat of the *balneum* will raise the fumes of the vinegar, and they will soften the pearls in the silk, and bring them to the consistence of a paste; which being done, take them out, and mould them to what bigness, shape, and form you please. Your mould must be of fine silver, the inside gilded; you must also refrain from touching the paste with your fingers, but use silver gilded utensils, with which fill your moulds: when you have moulded them, bore them through with a hog's bristle, or gold wire, and then let them dry a little; then thread them again on a gold wire, and put them in a glass; close it up, and set them in the sun to dry; after they are thoroughly dry, put them in a glass matraass, into a stream of running water, and leave them there twenty days; by that time they will contract the natural hardness and solidity of pearls: then take them out of the matraass, and hang them in mercury water, where they will moisten, swell, and assume their oriental beauty; after which, shift them into a matraass, hermetically closed up, to prevent any water coming to them, and let it down into a well, to continue there about eight days: then draw the matraass up, and in opening it, you will find pearls exactly resembling the oriental ones. This method is very excellent, and well worth the trouble, since, by experimenting so fine a secret, you will have the satisfaction of seeing the performance answer the direction above expected.

Mercury water is thus prepared:—"Take plate tin of Cornwall, calcine it, and let the calx be pure and fine;

“ then, with one ounce of the calx, and two ounces of
“ prepared mercury, make an amalgama; wash it with
“ fair water till the water remains insipid and clear;
“ then dry the amalgama thoroughly; put it into a
“ matrafs over a furnace, giving it such a heat as is requi-
“ site for sublimation. When the matter is well sublimated,
“ take off the matrafs, and let it cool. Take out that
“ sublimate, add an ounce of Venice sublimate to it, and
“ grind it together on a marble; put this into another
“ matrafs, close it, and set it upside down in a pail of
“ water; and the whole mass will dissolve itself in a little
“ time into mercury-water: this done, filter it into a glass
“ receiver, set it on a gentle ash fire to coagulate, and it
“ will turn into a crystalline substance; this beat in a glass
“ mortar with a glass pestle to a fine powder, searce it
“ through a fine sieve, and put it into a matrafs, stop it
“ close up, and place it in *balneum marie*; there let it
“ remain till it dissolves again into water, which is the
“ mercury water, fit for the above-mentioned use.”

To form large pearls of small ones, as directed by Korn-
dorfer: — Take of mercurial water fourteen ounces; put
two ounces *fulph. solis* into a low matrafs, pour the mer-
curial water upon it, and let it dissolve and extract; then
take of the whitest small pearls twenty ounces, put them
into a proper matrafs, and pour the said water upon it.
The pearls will, by degrees, dissolve, and at last turn to a
clear calx, much like dissolved silver calx; pour off the mer-
curial water; boil the calx well out, and dry it; then put
it into a clean crucible by itself, and melt and cast it into
what form you please. When cold, polish it in the same
manner as you do gems or crystals, and you will have your
work of the consistency and beauty of the finest and clearest
oriental pearls.

Choice secrets imitating precious stones, or for making artificial gems:—This curious art is arrived to that perfection that it is capable of imitating precious stones in their lustre, colour and beauty, even to surpass the natural ones, except in hardness, which, to obtain, has been, and, no doubt, still are, the endeavours of several ingenious men.

The art of making artificial gems consists chiefly in tightly imitating the tints of those that are real: these must be extracted from such things as resist the fire, and do not change their colour, though of a volatile nature: thus verdigrise being put into the fire is changed to another colour, but when put in fusion with crystal, it retains its natural colour.

You must, therefore, take such colours as change not, when mixed together: consequently, since blue and yellow make a green, you must take such blue as will not hurt the yellow when you mix them, and also such a yellow as shall not be detrimental to the blue, and so of the other colours. We shall give very plain and certain instructions to carry the ingenious artist with ease and pleasure through this labour, and first shew him—

To make a fair emerald:—Take of natural crystal four ounces; verdigrise, forty-eight grains; crocus martis, prepared with vinegar, eight grains; let the whole be finely pulverized and sifted; put this together in a crucible, leaving one inch empty; lute it well, and put it into a potter's furnace, where they make their earthen-ware, and let it stand there as long as they do their pots: when cold, break the crucible, and you will find a matter of a fine emerald colour, which, after it is cut, and set in gold, will surpass, in beauty, an oriental emerald: if you find that your matter is not refined, or purified enough, put it again, the second time, into the same furnace, and in lifting off

the cover you will see the matter shining; you may then break the crucible, but not before; for if you should put the matter into another crucible, the paste would be cloudy, and full of blisters: if you cannot come to a potter's furnace, you may build one yourself with a small expence, in which you may put twenty crucibles at once, each with a different colour, and one baking will produce a great variety of gems. Heat your furnace with hard and dry wood, and keep your matter in fusion twenty-four hours, which time it will require to be thoroughly purified; and, if you let it stand four or six hours longer, it will not be the worse for it.

To make paste for imitating an oriental topaz:—The colour of this stone is like water tinged with saffron or rhubarb: to imitate it, take of prepared natural crystal, one ounce; of red lead, seven ounces, finely powdered and searced; mix the whole together, and put it into a crucible, not quite full, by an inch, lest the matter should run over, or stick to the cover of the crucible in rising; then proceed as directed above.

To make an artificial chrysolite:—This stone is of a green colour, and some have the cast of gold; to imitate it, take natural crystal, prepared, two ounces; red lead, eight ounces; *crocus martis*, twelve grains; mix the whole finely together, and proceed as before, only leaving it a little longer in the furnace.

Another process for counterfeiting precious stones:—Take of black flint stones what quantity you please, and put them into a pail of hot water; and being wet, put them into a hot furnace; this will prevent their flying into small pieces; or else warm them thoroughly, by degrees, before you put them into the furnace: when you see that they are thorough red hot, then quench them in fair water, and they

will look of a fine white colour: dry and pulverize them very fine; this you may do in an iron mortar; but, as it may contract some of the iron, it will be proper, after you have taken it out, to pour on it some *agua fortis*, which will clear it of the iron, and so disengage it from all filth and impurities. Wash it in several clean hot waters.

This powder, thus prepared, is fit to be used for making the finest glass, and for imitating the clearest and most transparent gems, especially those that require the lustre of a diamond or ruby; as for a sapphire, emerald, topaz, chrysolite, spirel, amethyst, &c. your labour with *agua fortis* may be saved, if your mortar be bright, and free from rust; such as have a mortar of porphyry, or such like stone, have no occasion to use an iron one, but will save themselves a great deal of trouble.

In case you cannot have black flint stones, you may content yourself with pebble, but flint is far preferable, and makes the glass of a harder substance than that made of pebble.

Bartholomew Korndorfer's secret to make a diamond of natural crystal:—Take the best polished crystal, no matter whether large or small, so it is but clear and transparent; put it in a crucible, with three times as much of my fixed sulphur of gold, so that the crystal may be covered all over with it; then, after you have put a lid over it, and luted the crucible well, let it, for three days and nights, anneal in a strong fire; then take it out, and quench it in spring water, in which red hot steel is quenched forty-six times running, and you will have a diamond which resembles a natural one in every respect, and is right and good. Thus far Korndorfer—but as to his *sulphur*, he has left them in the dark.

How to make a diamond out of a sapphire, according to Porta's description:—We use to make it (the diamond) the

surest way, in this manner; we file l an earthen pipkin, or crucible, with quick-lime, and laid the sapphire in the midst thereof, covering it first with a tile, and then with coals all over, blowing them gently until we had a clear fire; for, if it is blown too much, it may occasion the breaking of the stone.

When we thought that the sapphire had changed its colour, we let the fire go out of itself, and took it out to see whether it was turned white; if so, then we laid it again in the crucible, in order to let it cool with the fire; but if it had not the right colour, then we augmented the heat again as before, and looked often to see whether the fire had taken away all the colour, which was done in about five or six hours; if then the blue colour was not quite gone, we began our operations afresh until it was white and clear. It is to be observed, that the heat of the fire, in the beginning of the operation, must increase by slow degrees, and also in the same manner decrease; for, if the stone comes either too suddenly into the heat, or from the heat into the cold, it is apt to turn dark, or fly to pieces.

In like manner all other precious stones lose their colour, some sooner than others, according as they are either harder or softer. The amethyst is very light, and requires but a slow fire; for, if it has too much heat, it becomes dark, or turns into chalk.

This is the art whereby inferior precious stones are changed into diamonds: they are afterwards cut in the middle, and a colour given them; and from hence comes the second sort of false diamonds, or doublets.

A plain direction concerning the polishing of these counterfeits, and also of natural gems:—It is to be observed, that all glass, or artificial stones, may be cut and polished after one method; namely, by strewing fine powdered emery upon a leaden plate with water, holding the stone firm, and grinding it in what form or shape one pleases.

If you throw ground tripoli, mixed with water, upon a pewter plate, and add a little copper ashes amongst it, it will have the same effect.

Pulverized antimony, strewed upon a smooth plate of lead, with the tripoli and vinegar, polishes not only glass, crystal, garnets, calcedons, agates, and amethysts, but all other natural stones, except the diamond. The diamond is only cut with the diamond powder itself. Any such diamonds which can be touched by emery, lead, copper, or other metals, or be cut therewith, are false; and this is a good test for knowing a real diamond.

The method of counter-drawing on artificial stones, the original cameiaus, intalios, and other gems, which are kept and preserved in the several museums of Europe:—Choose the finest sort of tripoli which can possibly be found; grind it on marble into an impalpable powder, and as subtile as possible; add a little water to it so as to make a sort of paste with it, of the consistence of colours on pallets for painting; when it is in that state, put it in a little square tin mould, with turned up edges; press well your paste down in it, and smoothen the surface: as soon as you see it begin to dry, stamp on it the seal of which you want to obtain the impression, and taking it off skilfully from the tripoli paste, let this dry thoroughly: when you find it is perfectly hard, and the strokes of the seal are solids, put on the impression some powder of crystal, or any artificial stone you please, whether red, green, blue, or any other colour; then, with a metal pipe, blow on that powder the flame of a candle, or a lamp, till the crystal is perfectly melted; when done, lay something, such as a small iron pallet, of nearly the size of the seal, on the melted paste, and press it gently to make it take the better the impression, and all the turns of the design, and then let it cool. When you take the crystal up, you will find it to be a perfect

copy of the original; you may then send it to the lapidary to be cut, and set for seal or ring as you like. From these very copies you may even get other copies, by following the same process of operation.

When you have made on the tripoli paste the impression of the original seal, the safest and shortest way would be to bake it in a furnace, under a tin arch, to prevent the coals from touching the impression, which might hurt and damage the relief; then take off your little tin mould, and, having put on the stamp crystal powder, or other fusible matter, you may place it again under the same arch, in the furnace; and when that powder is melted, do as before directed.

MISCELLANEOUS SECRETS.

TO preserve things from corruption in spirit of wine:—This is done in the most subtle rectified spirit of wine camphorized, wherein many sorts of animals, as birds, fishes, insects reptiles, &c. may be kept many years from decaying or corruption. Porta relates, that he had seen a fish at Rome, thus preserved, for above twenty years, which was as fresh as if alive: likewise at Florence he saw one that had been preserved above forty years. The glasses wherein they were kept were hermetically sealed, to keep the least air from coming to them.

The preparation of the spirit, or oil of salt, whereby things may be kept from corruption, and which is a great restorer and preserver of health:—Take sea-salt, as much as you please, put it in a crucible, covered, over a good coal fire, and when it has done crackling, take it off, and

put it in a damp place till it is dissolved; filter it often through a paper till it is thoroughly clear and fine; then let it digest in horse dung for about two months, changing the dung often for fresh, in order to keep it continually warm; then distil it over some sand, and you will have it in your receiver a salt oil, with a watery phlegm; distil this gently in a *baln.* and the oil will remain behind, but the watery substance be carried off. Whatever is put into this oil will keep from corruption, without changing, for ages. This is the salt spirit, which, by Paracelsus, is called, *viuolinsalis*, and has incomparable virtue, as well to restore men to health and vigour, as to preserve them from most distempers; four or six drops, taken in wormwood-water, is good for the dropsy, convulsions, and the yellow jaundice; three or four drops, taken in hartshorn water, is good for all sorts of agues; for worms, it is taken in brandy; three drops taken in carcit, or water of *Cardus Benedictus*, is good for the stoppage of urine. It is a fine remedy for all sorts of sprains and contractions of the nerves; it heals bruises and swellings when mixed with other ointments, and the affected parts are anointed therewith. When mixed with oil of turpentine, or wax, or camomile, it will assuage the gout. This oil, or spirit of salt, if well rectified, is a solvent of all sorts of metals and stones, and a key to many hidden mysteries.

But if this preservative is too costly to keep things from corruption, you may prepare a sea-water with a small expence, which will keep things for many years; and this you may do in the following manner:—After you have scarced your sea-salt, dissolve it in distilled rain-water, and make thereof a lee which will bear an egg; or, when the salt is scarced, put it into a damp place; and, when it is dissolved, filter it through a paper until it is clear and fine. This you

may use to preserve things from corruption, by distilling it, and pouring it over the thing to be preserved,

A secret to cause the transmutation of iron into the finest German steel:—Take of clean foot, one pound; oak wood ashes, twelve ounces; and four of pounded garlick: boil all together in twelve pounds of common water, reduced to a third; or four pounds: strain this, and dip in it the iron pegs, which you will afterwards stratify with the following cement:—Take burnt wood coals, otherwise called cokes, and quick-lime, of each three pounds; foot dried and calcinated in an iron pan, one pound; decompitate salt, four ounces: make of this and your iron several beds alternately, one over another; and having well luted the vessels in which you shall have made those beds of iron and cement, give them a reverberating fire, three times twenty-four hours, and the operation is done.

To preserve the brightness of arms:—Rub them with hart's marrow; or else dissolve some alum powder with the strongest vinegar you can find, (that of Montpellier, which serves to make their famous verdigrise, is the fittest) and rub your arms with it: by these means they keep forever bright and shining.

Against rust, spots, &c. in iron:—Crucible powder, sifted emery, and silver ore, all in fine powder: add thereto the beaten scales of iron, and rub the rusty parts with leather dipt therein.

To make tin:—Take a discretionable quantity of rye-bran, quite pure; boil it a minute or two in vinegar, then add to it a little water, and in that same instant plunge your sheets of black iron; then take out of the fire, and stop well the vessel. Let your iron rest there, and soak for twenty-four hours; after which time take off your iron sheets; score them well with the very bran in which they

have been soaking; then rub them over a little with grind-stones. This being done, make them soak again in a water wherein you shall have dissolved some ammoniac salt, whence having taken them off, set them to drain, and rub them afterwards with rye-bran, and your tin will be done.

Observe that the vessel in which you lay your sheets to soak, must be large enough to receive them in their full intended size.

To compose a metal of a gold colour:—Take refiner's copper, six ounces; melt it in a crucible; add one ounce of calaminary stone, half an ounce of tutty, and one of *terra merita*, in powder: give to this a melting fire for five or six hours running, and no more; then take off the crucible from the fire. Put this composition in powder, and add to it two ounces of common mercury, six of sea-salt, exsiccated, and a sufficient quantity of water. Set the whole to boil until there appears no more mercury; then put the matter into a crucible, and place it between two fires of kindled coals, avoiding carefully the breathing of the fumes: give this a melting fire for two hours; then wash the composition in water till this runs off quite clear; set this again in a crucible, and, when melted, pour it into an ingot; this will give you a metal of the most beautiful gold colour which can be desired, and which you may make use of for plates, buckles, snuff-boxes, cane-heads, &c. but one cannot recommend too much the avoiding of breathing the fumes of this composition, while it is making.

How to give some perfection to imperfect metals:—It is well known that gold is the most perfect of metals: after this comes silver, the principles of which are very nearly pure, and equally proportioned between them as those of gold; all other metals are reckoned imperfect and crude: among them, however, that which approaches nearest to per-

fection, is copper: this therefore may easily be purified by being delivered of all the superficial and combustible sulphure with which it is loaded; and whoever will proceed according to the following direction, will not fail to obtain it:

Take what quantity you please of copper, set it in a crucible over a melting fire; while melting in the crucible, throw in at different times some tutty-powder, mixed with equal parts of refined saltpetre; then, the detonations being made, take the crucible out of the fire, and let it cool; break the crucible, and separate the scories from the regulus: put the copper regulus into another crucible, and reiterate the same operation three times till the copper is extremely fine, and of a true gold colour.

Now, if you set it melting for the fourth time, and project on it perficaria's or hydro-pepper's leaves powder, you will render it still more perfect; and you might thus purify it so far as to give it, at last, all the qualities of gold.

Whoever will know how to purify brass from its foreign sulphur, will turn it likewise into a very fine silver.

You may also whiten lead; and, by giving it the hardness of silver, render it similar to it.

Pewter and quicksilver may likewise be purified, in separating from this last its arsenical sulphure, and fixing it by the supplement of a fixed, metallic, incombustible and solary sulphur: the other may, by taking off from it its superfluous saline part, and uniting its mercurial one to the true metallic sulphur; but this we cannot expect to attain, if not previously versed in the method of dissolving, analysing, and dividing or separating, and then re-embodiment again metallic substances; and this is known by none but the sons of the art, the adepts alone.

To restore gold to its weight after it has lost it in regal water :—Put a bit of tortoise-shell to soak for some time, in regal water ; then put your gold in it, and, by that means, it will recover its lost weight.

To operate the transmutation of silver into gold :—Get a new iron pan, make it red hot upon a trivet, and then put two pounds of lead into it ; as soon as this is melted, throw over it, by degrees, some good saltpetre pulverized, and this will melt likewise ; keep it thus in fusion till it is at least half dissipated ; should it take so reduring that time it does not signify, for it hurts nothing, and the more concocted over again the saltpetre is, the stronger the oil.

Let this cool ; divide the saltpetre from the lead ; after having well pounded it on a marble stone, carry it into the cellar, there it will fall into deliquium which you will pour into a cucurbit, with double its weight of true French spirit of wine, added by a little and little at a time ; then distil by a slow fire ; grind on marble as before ; what remains in the cucurbit, and being turned into deliquium, put it again into the cucurbit with some more spirit of wine ; take off these dissolutions and cohobations, repeating the same process over again as before, till the saltpetre remains at the bottom of the cucurbit resolved into a true oil which congeals itself no longer ; and this will procure you what is called the fix-balm.

Next to that operation you will make an *aqua fortis* with equal parts of saltpetre, dried vitriol, and roch-alum ; and before you put the receiver to the cucurbit, add steel filings, antimony, verdigrise, in subtile powder, tutty and cinnabar, of each half an ounce ; or one ounce, according to the quantity of *aqua fortis* you want to draw. Cohobate the spirits seven times over upon the fæces, which you will grind each time on a marble table.

Dissolve one ounce of silver in three of this liquor; and on that solution, still, drop by drop, one ounce of your nitre-oil, in a bottle made like the hour-glasses, which, after the operation, must be at most only half full, and which you will cover with another inverted, so that the neck of the under one should get into that of the upper one; or else, put it in a matras with a long neck, which you will seal hermetically; but, if you make use of bottles, take care to lute the joints; place this over hot ashes, and plunge it, in them to the height of six inches: give under this a lamp fire, which should not reach the matter by three fingers distance. You will get every day to the amount of a silver pennyweight of silver fixed into gold; and, when the whole shall have been fixed thus, day after day, the *aqua fortis*, which before was green as an emerald, will become as clear as pump-water: let the composition cool, and divide the water from the oil, which will never be the worse for use, and must therefore be preserved. At the bottom of the vessel you will find the silver fixed into gold.

Permutation of lead into silver:—Take fine lead, calcine it with common salt, or else with that sort of salt which is extracted from the dregs, faeces, or *caput mortuum* of saltpetre and vitriol calcinated both together; soak the whole warmly with oil of vitriol till you make it come into an unctuous paste; this you will put into a pot or crucible, well luted, and placed in a pan full of sand, with which you will cover it over intirely; make under this a digesting fire, that is to say, such a fire as is necessary to warm the sand; keep it so for ten days, then take off your matter, and test it. Out of one hundred and five pounds of lead, you will draw five marcs, or two pounds and a half weight of silver, capable to stand the test.

Transmutation of iron into copper:—Iron is easily changed into copper by means of the vitriol; to do this, you put your iron, *stratum super stratum*, in a *descensorium*, and set it over a strong blast fire, pushed by bellows till the iron melts and flows into copper: you must not forget, when you have made your beds of vitriol, to water them a little over with vinegar saturated of saltpetre, alkaline, and tartar salts and verdigrise.

Spots very effectually taken out of silk, linen, or woollen:—Spirits of turpentine twelve drops, and the same quantity of spirits of wine; grind those with an ounce of pipe-maker's clay, and rub the spots therewith: you are to wet the composition when you do either silk, linen, or woollen with it: let it remain till dry, then rub it off, and the spot or spots will disappear. The ingenious Dr. Godfrey says, that true spirits of salts is the only thing to remove iron moulds from linen; and sal-armoniac, with lime, takes out the stains of wine.

An excellent water for taking out spots in cloth, stuff, &c.—Spring water a quart; put into it a little pot-ashes, about the quantity of a walnut, and a lemon cut in small pieces; let it stand twenty-four hours in the sun; then strain it through a cloth, and bottle the clear liquor for use. It takes out all sorts of spots in any kind of thing. Wash the place where the spots were, after being taken out, with fair water. This liquid is preferable to the before-mentioned balls for taking out spots, &c.

For preserving iron and steel from rust:—Take an eel, fry it, press out the oil, and rub your furniture in meta therewith.

Against moths, worms, &c.—Dry the herb botris, strew it among your cloaths, and neither moth or worm comes near them.

How to make ball soap, and its great use in families :—

This soap is easily made, and goes much farther than the other soap. You are to make a lee from ashes and tallow ; then put the lees into a copper, and boil them till the watery part is quite gone, and there remain nothing in the copper but a sort of nitrous matter ; to this the tallow is put, and the copper kept boiling and stirring for above half an hour, in which time the soap is made ; it is then taken out of the copper, and put into tubs, or baskets with sheets in them, and immediately, whilst warm, made into balls. You are to take notice, that it requires near twenty-four hours to boil away the watry part of the lee.

Chinese method of mending China :—Boil a piece of white flint glass in river water five or six minutes ; beat it to a fine powder, and grind it well with the white of an egg, and it joins China without riveting, so that no art can break it again in the same place. You are to observe, that the composition is to be ground extremely fine on a painter's stone. *vide. Rec. Cyclopedie. Art. Cement*

A good common cement :—Beat the white of an egg very clear, and mix it in lime in very fine powder ; join the broken pieces together with this, and let them stand till they are quite dry.

A very strong cement for broken China-ware :—Take equal parts of isinglass, mastic and turpentine ; beat them together in a stone mortar till they are well united, and then join the pieces well together. They will sooner break in a new than the old place. If the turpentine is not enough to render the other ingredients of a proper consistence, add more till it is.

To join broken amber :—Anoint the pieces with linseed oil, and hold them as close to the fire as you can till they stick, and then set them by to dry at leisure.

A certain method to whiten ivory:—When ivory is turned yellow or red, with long keeping, boil it in strong lime-water, suppose a pound of lime to a quart of water; and, if that has not the desired effect, add more lime. This method never fails to bring it to a proper whiteness.

To make fine hard red sealing-wax:—Take of gum-lac, or shell-lac, half a pound; melt it in an earthen vessel, and then add an ounce and a half, or two ounces, of vermillion, in very fine powder: when they are well mixed over the fire, and are become of a proper coolness, make them into sticks or balls. If you would have a coarser sort, take half lac, and half rosin. If a coarser sort still, take red lead instead of vermillion.

To make black sealing-wax:—Use the same lac in the manner directed above, only, instead of vermillion, mix it with ivory-black.

To make oil-cloth for hats and other uses:—Take drying-oil, and set over the fire, and then dissolve rosin in it; or, which is better, but dearer, gum-lac. There must be so much of either as will bring the oil to the consistence of balsam; then add some colour to it, as verdigrise for a green, umber for a hair colour, white lead and lamp-black for a grey, or indigo and white for a light blue; spread this over canvass or linen cloth, so that it may be fully drenched or glazed over with a brush; and when it is quite dry, no wet can touch it. That made of lac, and applied to fine linen, would make good great coats for those that travel much in all weathers. Some have lately laid this composition on silk. These fine sorts may be rolled up, and put in the pocket, being exceedingly proper for gentlemen, or any that ride out with good cloaths, and would not have them spoiled. Some of this varnish should be laid on the seams after the garment is made, and then no wet can soak through.

To make red ink:—Take three pints of stale beer, and four ounces of Brazil wood; simmer them together for an hour; then strain it through a flannel, and bottle it up for use.

Secret writing:—If you dip your pen in the juice of a lemon, or of an onion, in urine, or in spirits of vitriol, and write on clean paper whatever you intend, it cannot be discerned till you hold it to the fire, when it will appear legible; and if with any of the aforementioned, you write upon your skin, as on your arm, or back of your hand, it cannot be seen till rubbed with the ashes of burnt paper, when it will be very legible.

To make spirit varnish for wood, &c.—Shell-lac, dissolved in spirit of wine: there should be enough of the gum to make the spirit of a deep red colour.

Isinglass, dissolved in brandy, or good vinegar, makes a strong cement for wood, paper, &c.

To make paper transparent:—Take one ounce of balsam canada, and put to it double the quantity of spirits of turpentine; shake them in a phial, rub your paper on one, or both sides, as you find requisite, by the fire: it will be fit for use in a few days.

To make transparent paper:—Dissolve Burgundy pitch in turpentine; the proportion of half a pound to a pint, to which put about a spoonful of copal varnish. Brush this mixture thin upon gauze, or bank post paper, and hang it up to dry.

To make permanent white:—Dissolve litharge in spirit of nitre; precipitate with a few drops of oil of vitriol, wash the acid from it, filter and dry it.

N. B. When the litharge and acid have done fermenting, shake the bottle, and pour the turbid solution into a clean one; precipitate, then pour the acid into the first

bottle to work again; and proceed as before, having acquired a sufficient quantity from off the acid, and wash till there are no remains of it: afterwards filter and dry it.

To make good black ink:—To six quarts of rain water put one pound and a half of fresh blue galls of Aleppo, bruised pretty small; eight ounces of copperas, eight ounces of clean, bright and clear gum arabic, and two ounces of rock-alum; let these stand together in a large stone bottle, with a narrow mouth, to keep it free from dust; shake, roll, or stir it well once every day, and you will have excellent ink in about a month; and the older it grows the better it will be for use. Ingredients for a quart: one quart of water; four ounces of galls, two ounces of copperas, two ounces of gum arabic, mixed as above.

To make the hard varnish for etching:—Equal quantities of gum-arabic and boiled oil: pound the gum, and dissolve it in the oil over a slow fire; strain it for use. When it has been made some time, it will grow fat, and will require warming before it is used.

The *aqua fortis*, for the hard varnish, (according to Le Bossé,) may be thus prepared:—Take three pints of vinegar, six ounces of *sal-ammoniacus*, the same quantity of common salt, and four ounces of verdigrise, or in proportion according to the quantity of *aqua fortis* that is wanted. Pound the solid ingredients very small, and put the whole together in a varnished earthen pot, of a size larger than will contain them, that there may be room for them to boil without overflowing. Cover the pot with its lid, and then place it on a strong fire, and make the whole as quickly as possible, boil up two or three times, and no more. When the matter appears ready to boil, but not sooner, uncover the pot, and stir the whole together from time to time with a small stick, taking care when the

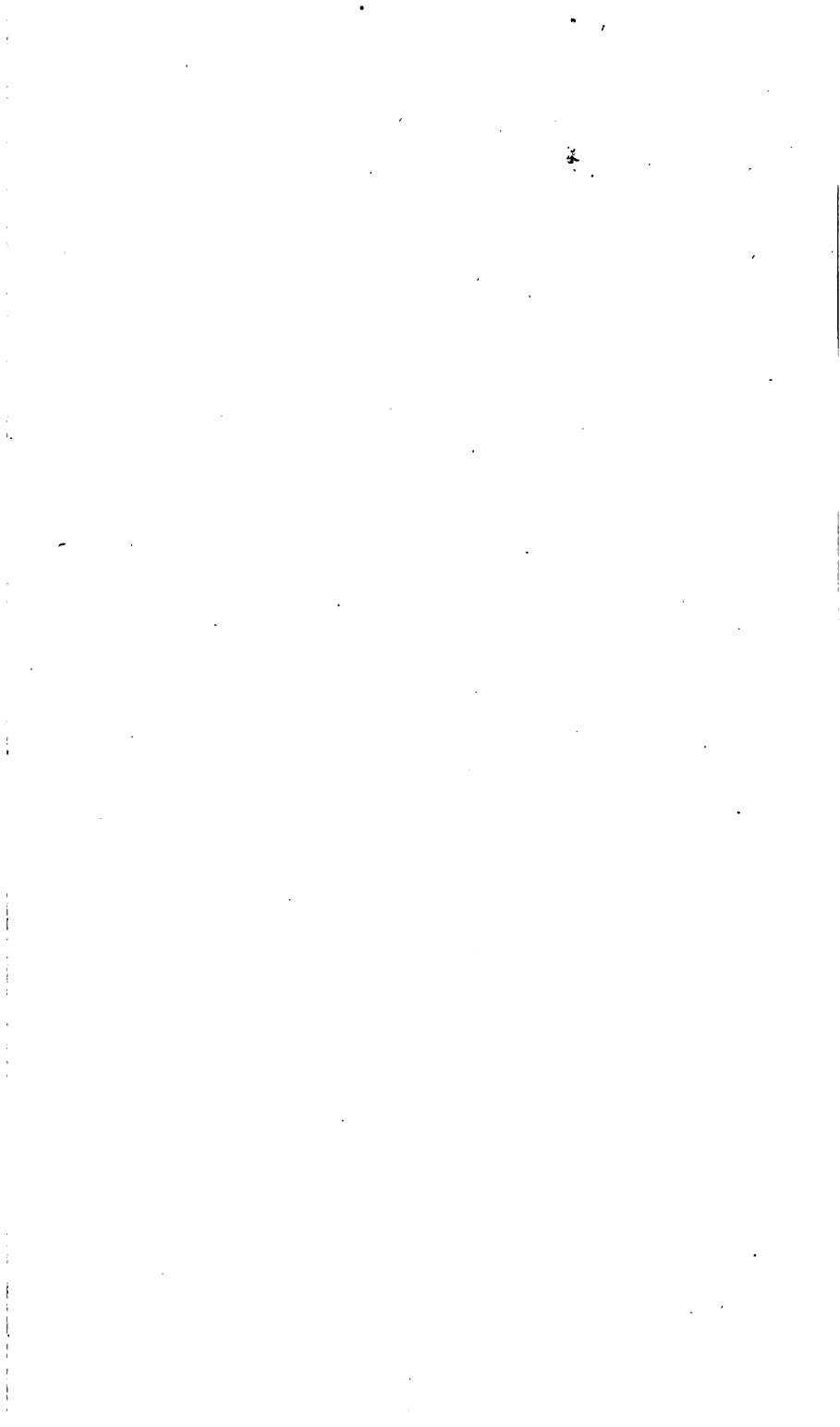
ebullition rises strongly, that the *aqua fortis* does not boil over, for which reason the pot is advised to be large, because, commonly, when the mixture begins to boil, it swells and rises greatly; having boiled up three times, the pot must be taken off the fire, and the *aqua fortis* left to cool in it, and, being cold, it must be poured into a bottle of glass or stone, keeping it a day or two before it is used: if in making use of it, it be found too strong, and that it turns the hatches into paste by so scaling the varnish, nothing more is required than to moderate it by mixing a glass or two of the same vinegar of which it is made.

Cement for mending China cups, glasses, &c.—Take a piece of Cheshire or Gloucestershire cheese, boil it in three or four different waters till it forms a soft elastic mass, freed from the whey and the extraneous ingredients. After having expressed all the water from this mass, and while yet warm, it must be gradually rubbed upon a piece of marble, such as is used by colourmen, and as much unslacked, or quick-lime, in powder, must be added, as will be absorbed by the cheese, without making it too hard. This compound forms the strongest possible cement; if allowed to dry slowly, it is able to withstand fire as well as water.

A composition made to the consistence of glaziers' putty, by linseed oil, of six parts yellow potters' clay, and one part steel filings, will well answer to stop holes in pots and other culinary vessels.







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